The Builder.

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Robert Stephenson—Pontifex Maximus.

PERHAPS no other thing in the whole range of constructive art is of greater necessity than a bridge. Scarcely anything gives a higher idea of man's power, or affords a wider field for the embodiment of engineering and artistic genius. The modern command over iron in large quantities, while it afforded the material for, also led to the laying down of, railways, and, as a resulting consequence, to an enormous demand for railway bridges. It was estimated by Robert Stephenson, that up to 1856 no less than 25,000 bridges must have been built in Great Britain alone. It was only natural that Robert Stephenson should get the lion's share in the construction of these, not merely as to number, but also as to the magnitude of the bridge-building problems placed before him for solution. The name of Robert Stephenson—to be otherwise mainly remembered as a great builder of railway lines—will thus, literally, pass over to posterity on his great bridges.

His name is more especially connected with three great bridges, as important in their objects as from a scientific and practical point of view. These are the Britannia Bridge, carrying the Chester and Holyhead Railway over the Straits of Menai; the High-level Bridge across the Tyne at Newcastle; and the great Victoria Bridge over the St. Lawrence in Canada. Mr. Stephenson seems to have been conscious that his more enduring fame would rest upon his achievements in bridge work. He took a great interest in the subject; so much so, indeed, that he found time to write the article "Iron Bridges" for the eighth edition of the *Encyclopædia Britannica*. The Britannia Bridge was, at the time it was built, the most original bridge in the world; the High-level bridge is probably the highest; and the Victoria Bridge, over the St. Lawrence, is the largest bridge in the world. A remarkably clear and able chapter is given by Professor Pole* to a popular explanation of the principles, and to a sketch of the history of bridge building. As Robert Stephenson says in his article, "though in elegance and durability iron cannot compete with stone," yet its use has become an absolute necessity for railway bridges "where headway is so frequently of paramount importance, and where rapidity of execution is often a more necessary consideration than even economy or durability; while the defective foundations that have so often to be contended with render the lightness, the independent strength, and the pliable character of iron of the utmost value for such structures." The first bridges were doubtless *beams* of wood laid across the stream or the gap. Then came the *arch*, permitting a much larger span,—an invention of unknown antiquity, and developed in brick and stone with great skill by the Romans. The modern manufacture of wrought-iron has, curiously enough, caused us to revert to the primitive form of bridge,—the beam. Iron bridges were proposed in Italy in the sixteenth century; they were again mooted by Dr. Desaguliers in the beginning of the last century; and an iron bridge was begun at Lyons, in 1755, but was abandoned for a timber bridge. The first iron bridge was built in this country, in 1769, at Coalbrookdale, and in 1794 two small iron bridges were put up in Germany. Telford, in 1796, built an iron arch of 130 feet span across the Severn. In the same year was finished a bridge over the Wear, near Sunderland, said by Stephenson to be one of the boldest examples of arch construction in existence. This bridge has certainly a most romantic history. Its origin is due to the celebrated Tom Paine, who had a great talent for mechanics. He first proposed to construct cast-iron arches with framed open panels in the form of voussoirs, and he made an experimental arch of 80½ ft. span, which he exhibited at Paddington. During the same year the feasibility of superseding the dangerous ferry at Wearmouth was considered by a committee. It was decided to adopt Paine's ideas, and part of the ironwork of his experimental arch was built into the present bridge, and can still be identified. "The span of this bridge, which is in one segmental arch, is no less than 236 feet, only 4 feet less than the centre arch of Southwark Bridge, the largest in existence, and yet it contains only about one-fifth the weight of iron." This very bridge was sold by a lottery in 1816 for 30,000*l.*—3,000*l.* more than its original cost,—and some alterations it subsequently required actually formed the last work of Robert Stephenson. The cast-iron arch was afterwards rapidly developed, until it reached its apogee in the Southwark Bridge, the finest structure of this class.

Then began the present reign of wrought iron, to be, no doubt, in its turn, superseded by steel. The distinguishing property of wrought iron as compared with cast iron is its power of taking a greater tensile strain with a greater range of extension, and with much less weight of material. The first application of the tensile strength of wrought iron to bridge-work was the suspension-bridge, and this form of bridge may be said to have been fully developed by the late Captain Samuel Brown, the introducer of chain-cables into the Navy. The suspension-bridge was then taken in hand by Telford (1819), with the famous bridge over the Menai Straits as a result. This was finished and opened in 1826, three years before the great trials of the locomotive on the Liverpool and Manchester railway. With the introduction of railways a new era began for the application of iron to bridge-work, as well as to many other things:—

> "Hitherto bridges had been applied generally to common roads; if the arch was adopted, inclined approaches were of small importance; and in determining the rise of his arch, the engineer selected any headway he thought proper, while every other consideration was likewise made subsidiary to the problem of constructing the bridge itself. If the suspension-bridge was chosen for the purpose, the passing load was light, and its speed of transit could be easily reduced to suit the comparatively unstable nature of the structure. But on the introduction of railroads, hundreds of roads, rivers, and valleys, had at once to be spanned with bridges perfectly level, and of a strength and rigidity sufficient to allow the dashing across of the ponderous and swift locomotive, instead of the light coach or the quiet team."

This rapidity of execution became of very much more importance than with the bridges spanning the old roads, as a stoppage at one portion of a railway line is pretty nearly equivalent to a stoppage of the whole length. The flexible suspension-bridge was quite out of the question, while the cast-iron arch was of only limited application, on account of its great weight and its incapability of being cheaply used for large spans. Some new form of bridge was thus necessary, and this was found by going back to the primitive straight beam, which is in fact the parent of many gigantic modern structures. The girder combines in itself the resistance to compression of the arch and the resistance to tension of the suspension bridge. While more rigid and firmer than a chain, it is straight, and affords a clear headway; it does not require abutments to resist horizontal strains; it is lighter than an arch, and is easily erected. Cast-iron was first employed for girders by Messrs. Boulton & Watt in 1800. Then came an important modification of the cast-iron arch in order to enable it to meet the exigencies of railway traffic. The two ends were strung together like a bow, thus taking up the horizontal thrust. The finest bridge upon the bowstring girder principle is that at Newcastle-upon-Tyne. Then came the combined girder, or a cast-iron girder in which the low tensile power of the bottom flange was aided by wrought-iron tie-rods. The progress of this form was greatly checked through the failure of a bridge on this plan at Chester, in 1847. A very full and interesting account is here given of this matter—important in itself and in its consequences. One of its results was the famous Commission of Inquiry into the Application of Iron to Railway Structures—the most valuable investigation that was ever conducted into the strength of materials. Two years previously to 1847, the experiments carried out with a view to investigate the tubular principle effected a complete revolution in bridge-building. In July, 1846, Mr. Stephenson gave instructions for a bridge on this principle, but with a cast-iron top, for a road at Chalk Farm, crossing over the North Western Railway. "This bridge was 60 ft. span; it was completed in March, 1847, and was *the first actual application* of hollow wrought-iron girders to the construction of bridges." As Mr. Pole remarks, the iron-girder bridges may be divided into eight kinds:—1, solid beams; 2, trussed cast-iron girders; 3, bowstring girders; 4, simple I-shaped girders; 5, tubular or hollow-plate girders; 6, triangular-framed girders; 7, lattice girders; 8, rigid suspension girders. The four last are modifications and products of the fruitful tubular principle. A very spirited account is given by Professor Pole of the erection and construction of the Conway and Menai tubular bridges; Mr. Stephenson himself has also given a narrative of the early history of the design, and several accounts of the remarkable structures have been published at different times. So much has not, however, been published about the high-level bridge at Newcastle, and the Victoria Bridge over the St. Lawrence.*

The immense importance of the high-level bridge at Newcastle-on-Tyne may be estimated from the fact that before its erection, so long ago as 1844, the cost of conveyance of passengers and merchandise by coaches and omnibuses across the river rose to the sum of 1,000*l.* per week. Robert Stephenson put the design in hand in 1845; it was passed by the Government inspector in 1849, and shortly afterwards opened by the Queen herself. The height of the rails in the upper platform above the river at low water is 120 ft., while the level of the carriage-road is about 23 ft. lower. Some of the piers are as much as 146 ft. high; many of the piles upon which they are founded are 40 ft. long, being 13 in. square, and 4 ft. centre to centre. The greatest weight to be borne by each is 70 tons,—a heavy load, and only to be warranted by the excellence of the strata. "In moderately compact clay it is usual to consider the maximum bearing power of a pile to be about 12 tons; in hard clay, about 25 tons; but in gravel, of which

* "The Life of Robert Stephenson, F.R.S., &c., &c., late President of the Institution of Civil Engineers. By J. C. Jeaffreson. With descriptive chapters on some of his most important Professional Works, by William Pole, F.R.S., Member of the Institution of Civil Engineers. London: Longmans. 1864."

* Information on all of these will be found in previous volumes of the *Builder*.

the bed of the Tyne consists, 70 or 80 tons are often allowed." Stephenson, however, with his usual caution, "tested one of the piles, by laying on it a load of 150 tons, which was allowed to remain for several days; but on its removal no settlement whatever had taken place." At the time (1845) at which this bridge was designed, before the labours of the Commission on Iron Structures, the experiments which led to the adoption of the tubular girder were only just begun, so that Robert Stephenson had to make his choice from the only kinds of wrought-iron bridges for large spans then known. There were the suspension-bridge, the compound trussed girder, the cast-iron arch, and the bowstring girder. The suspension-bridge had just been decided by Mr. Stephenson as unfit for railway purposes; he was probably afraid to trust to the compound girder—his experience told him, that with such a great height of pier, it would be unsafe to trust to cast-iron arches—so that there only remained the bowstring girder. It is possible that if he had designed this bridge rather later, he might have used the tubular girder, and he would have thus produced a cheaper, but as certainly an uglier, structure—similar, in fact, to those which now disgrace our metropolis. Each span is taken by four girders, the principal portion of each consisting of a cast-iron bow, the thrust of which is taken by a wrought-iron tie uniting the two ends together. The platform is above the top of the arches, while the roadway below is hung from them by means of wrought-iron suspension-rods. The entire width of the bridge is about 46 ft. The whole forms a very handsome as well as remarkable structure. It is stated that "designs were made for ornamental entrances to the bridge, in keeping with the decorative features of the structure; but the authorities of the railway and the town grudged the few hundreds of pounds necessary for their erection, and the work is left incomplete." A curious fact was noticed during the driving of the piles. "During flood tide the sand became so hard as to resist almost entirely the utmost efforts of driving; while at ebb it was quite loose, and in no way hindered the operation. It was found necessary to abandon the driving on many occasions during the entrance of the tide." Nasmyth's steam pile-driver was here used, and was found to be very useful. After a pile had been driven down as far as possible by the ordinary monkey, it was found that the steam-driver could send it down some 15 ft. deeper. It is also noticeable that the piles used for the coffer-dams were not drawn, but were cut off level with the bed of the river, so that the stumps could be left to protect the foundations. The iron-work was made by Messrs. Hawkes, Crawshay, & Co., but previously to its manufacture, Stephenson undertook the valuable series of experiments in cast-iron, which are printed in full detail in the Report of the Royal Commission on the Application of Iron to Railway Structures, 1849. The masonry amounts to 686,000 cubic feet, and the weight of the iron-work to 5,050 tons. The cost of the work was 243,000*l.*: this includes the cost of the temporary bridge of timber which was put up on account of the great importance of getting along the ravine as soon as possible.

The Victoria Bridge, the largest in the world, was opened a few months after the death of its designer. It carries the Grand Trunk Railway of Canada across the Saint Lawrence to near Montreal, thus effecting a communication between the interior and the sea, during the six months of the year that the Saint Lawrence is blocked up by ice. The Grand Trunk Railway thus—

"Traverses British North America in one unbroken line for half the breadth of a continent; it connects and associates together the several wide-lying dependencies of the British Crown; it affords throughout the year to the inhabitants of the wonderful valley through which it passes constant means of communication and transport which nature has denied them; it opens out the rich prairie country of the Far West; and it unites the whole of these vast regions with the neighbouring territories of America, and with the great maritime pathway of the world."

The engineering difficulties in the erection of the Victoria Bridge were peculiar, and scarcely known in English practice. These were the extraordinary effects produced by the Canadian winters. As is remarked by Mr. Logan, in the proceedings of the Geological Society:—

"In consequence of the 'packing' and piling of the ice, as well as the accumulation of the moistened snow of the season, and the freezing of the whole into a solid body, sometimes more than 20 ft. thick, the water suddenly rises, and lifting a wide expanse of the entire covering of the St. Lawrence, urges it forward with terrific violence, piling up the rended masses on the banks of the narrower parts of the river, to the height of 40 ft. or 50 ft."

The great problem thus consisted in making the numerous piers of the bridge in such a way, as while impeding the progress of the ice as little as possible, they should at the same time be able to resist the enormous efforts of such a mass in movement. In 1846, a citizen of Montreal, the Hon. John Young, pointed out the advantages of such a bridge, and surveys and soundings were taken by some of the Canadian railway companies. Some years afterwards, Mr. A. M. Ross, who formerly had charge of the masonry on the Conway Tubular Bridge, was engaged by the promoters of the Grand Trunk Railway Company as their engineer in Canada, and one of the principal subjects of inquiry was the crossing the St. Lawrence by a bridge. Mr. Ross suggested that the iron tubular beam principle would be applicable for the structure.

It was deemed desirable by the directors that Mr. Stephenson's opinion should be obtained, and Mr. Ross, on his return to England, laid before him all the information that had been collected. In 1853 Mr. Stephenson and Mr. Ross laid a design and joint report before the directors, and in September the contract was let for the bridge to Messrs. William Jackson, S. M. Peto, T. Brassey, and E. L. Betts, for 1,400,000*l.* At the site of the bridge the river is nearly a mile and three-quarters wide. The level of the river varies during the year; when it is covered with ice, it rises from 10 ft. to 15 ft. above summer level. The current runs with a speed of from seven to eight miles an hour. The bed of the river consists of slate rock, and large boulders were encountered at different portions, and had to be cleared away for the piers. The superstructure of the bridge intended for only one line of railway, consists of a simple iron tube from end to end, through which the trains pass. The most peculiar portion may be said to be the twenty-four piers, and a side elevation of one of these is given in the work.

"They are built of solid masonry, composed of heavy stones, from 5 tons to 20 tons each. They are founded with their footings resting on the solid rock, and are carried up, with the dimensions of about 90 ft. wide by 23 ft. thick, to within 6 ft. of summer water level, at which point the ice-breaking plane begins. This is a slope of masonry in the upside of the pier, inclining backwards at an angle of about 45 degrees with the horizontal, until it reaches a height of about 20 ft. above the highest or winter level of the river. The face of this slope is pointed, like a cutwater, and the masonry is formed of large solid stones worked perfectly smooth, and strongly bound together internally with iron cramps, to resist the enormous thrust upon them. When the large floes, or sheets of ice running down the river, come in contact with these massive constructions, they are turned upwards by the slopes, and, breaking down or toppling over by their own weight on each side of the cutwater ridges, they fall into the open spaces between the piers, and so pass harmlessly down the river."

Above the ice-slopes the piers are carried up to the tubes, and measure about 33 ft. by 16 ft. The two piers at the centre are of rather larger dimensions. The stone used in the piers is a hard grey limestone, and the quantity of masonry is in all about 2,713,000 cubic feet. A line of railway, of the 5-ft. 6-in. gauge used in Canada, is laid on longitudinal sleepers, and a footway, 4 ft. wide, is placed on one side, for the passage of the railwhy servants. The weight of the whole ironwork is 9,944 tons; more than 3,000 men were employed in the construction of the bridge; and upwards of 2,250,000 cubic feet of timber were used in the temporary works. The credit of the carrying out of the design,—a work of no small responsibility,—is due to Mr. Ross and to Mr. Hodges, the contractors' engineers. The work lasted longer than was expected, as the only available time for operations in the river itself was during the summer months. No temporary works could be left in the river during the ice season, so that the dams had to be so made that they could be readily floated again when the masonry within them was finished. Each caisson was 188 ft. long by 90 ft. wide; and the front part was made wedge-shape, to stem the current, the stern being made movable, to allow of its being taken away when the pier had been built. Some delay occurred in removing two of the dams before the formation of the ice, and they were thus carried away when the ice broke up. It was found that the works were likely to extend over several years, as the available time was scarcely six months, while the severity of the cold rendered sixteen weeks the whole working season for carrying out the masonry of the bridge. In order, however, to carry on the masonry work during the winter, a very ingenious plan was adopted, which had been previously carried out at St. Anne's Bridge, over the river Ottawa.

"Strips of asphalted felt, about 3 in. in width, were laid along the whole of the front of the masonry, at such a distance from the edge that the work might be effectually pointed. On each side of the cross-joints similar strips were placed, as likewise at the back of the stones. As soon as one course of ashlar was laid, it was dressed perfectly fair on the bed to a straight edge, for the reception of another course, which was superimposed in a similar manner, the backing being laid dry, and packed as closely as possible; then spaces or flues were left, about 1 ft. square, throughout the whole height of the pier. The work was completed in this manner during the winter, and as soon as the weather permitted, and the frost was fairly out of the stone, the piers were carefully pointed, and the whole of the interior well grouted from the flues. The whole thus became one solid mass, the clear water which filtered through the joints showing very accurately the progress of the grouting."

This admirably skilful plan is said to have greatly hastened the completion of the works. At last the bridge was opened, on August 25th 1860, by the Prince of Wales, who visited Canada for the purpose. It is to be hoped that this most extraordinary bridge will remain for centuries what it is now—a great monument to the engineering science of Mr. Robert Stephenson, and to the skill and energy of those who carried out the design. There is little to complain of in this very valuable and honest book, but, as is generally the case with biographers, they seem incapable of doing justice to any one connected with their hero. The *lues Boswelliana* seems to be as universal and unavoidable a malady as the measles are with children. In this way, we do not think that quite sufficient justice has been done in this narrative to Mr. Ross, who had such a large share in the undertaking, from its beginning to its practical achievement.

Such is the brief recital of the more prominent of the more glorious of the works of a man of whom England has indeed a right to be proud. Would that all would imitate his kindly, generous disposition, though Robert Stephenson's power of intellect might be unattainable by imitation. It is melancholy to think that this man, the most successful engineer of the age, was yet unhappy a good portion of his later life, through the death of his childless wife. The prominent feature in Robert Stephenson's professional character was undoubtedly his caution. His prudence and foresight, as is very often remarked by his present biographers, much conduced, in the great situations of trust in which he was placed, to his personal success in professional life, and to the success of his individual undertakings. He seems never to have trusted to chance,—never to have hoped for things that might turn up, but were not certain of doing so; he always, like a good general, left himself a way for retreat, and kept himself prepared for all contingencies. Here we have perhaps an instance of what may be termed the influence of disposition, of tendency, on the intellect. Robert Stephenson seems to have been deficient in hopefulness. This tendency, while it kept him from the brilliant blunders of Brunel, also seems to have followed him into private life. After being absolutely satiated with the world's honours,—while being held by all men as the foremost engineer in the world,—this great man, great in both intellect and heart, seems to have given way to hypochondriacal despondency. Perhaps a more buoyant disposition, a more hopeful temperament, would have diminished his success as an engineer, but would have made him happier as a man. A most important portion of this book consists in a number of reports, written and signed by Robert Stephenson himself, on such momentous questions as the atmospheric system of railways; the broad and narrow gauges, and on different engineering undertakings that he carried out. They are all written in an admirable style, well suited to the subjects and to the writer—"*le style c'est l'homme.*"

We feel no hesitation in saying that this is not merely the best life of Stephenson, but also the best engineering biography which has yet appeared. It is a thoroughly honest and complete book, entirely free from the errors in matters of theoretical and practical science which are so distressing to a professional reader. The life of an engineer can only be written by an engineer, and the professional aid of Mr. Pole, given to Mr. Cordy Jeaffreson, fulfils this requirement.

Exhibition of Water-Colour Sketches.—The third Winter Exhibition of Sketches and Studies opened by the Society of Painters in Water-Colour, in their gallery, Pall Mall East, consists of 458 works, and includes specimens by nearly all their members. We must endeavour to return to it.

THE NATION'S PROGRESS IN SCIENCE.

One of the most curious trains of thought we can follow is that which leads us back into the early days of the world. It seems paradoxical that the men who lived on the earth's surface thousands of years ago, should not have known so much of the nature of the orb as we who people it at this late period; and that the generations of men who will succeed us, will probably obtain much more definite information than we possess: in other words, that those beings most removed from the period of the formation of the world should be better acquainted with the various facts attending the marvellous work than those who first trod the virgin soil. And that, not only were the early peoples—the men of the ages of stone, bronze, and iron—ignorant of the nature of their vast habitation, but, as time passed on and civilization became developed out of a concretion, as it were, of human sympathies, desires, and aspirations, erroneous theories were built up and accepted by mankind as facts. And it is only in the slow course of centuries that errors are discarded and truths discovered. There has been, too, until recent times, an unaccountable reluctance to receive scientific truths, which circumstance adds another perplexity to the puzzle. The first man who informed his fellow creatures that the earth possessed a diurnal motion, was cast into prison, and kept there till he signed a recantation, declaring that such a propositon was absurd and philosophically false. Many fabulous animals were supposed to exist upon the earth, even by learned men, as late as the seventeenth century, who, at the same time, would not credit the existence of some of the creatures to be seen at the present day in the Zoological Gardens. And, still later, the antagonism with which Dr. Jenner's announcement of the value of vaccination was received, is another familar instance of the old disinclination to welcome scientific truths. But this feeling has been superseded by a wistful, earnest desire to study the wondrous works of the Creator, and read as many pages as we may of Nature's book,—a book that is spread open, it is true, but written in characters many of which are yet unintelligible. The contents of this ponderous tome are, however, too varied to be mastered by any one man. Those most competent to read any part of it know that it is only by confining themselves to one especial department that they may decipher it. Thus it has come to pass that the most distinguished scientific scholars are those who have made a minute subdivision of a chapter the study of a life. A *savant* who has mastered the reading of one page has it in his power to convey the knowledge he has acquired to others, as well as to receive the yield of other men's labours in equally limited spheres. In this way, although the field in which each individual works is small, the general gain is great. A most important influence for the furtherance of science is the organization of associations for its advancement. There was nothing like this in old times. A solitary scholar here and there shone out in the dark centuries of the past as a lighthouse in the sea of time, and the waves of popular indignation or applause beat about his feet according to the measure of favour with which his readings were received. Now there are countless scholars, countless watchers of the heavens, countless dredgers of the deep, countless probers of the crust of the earth, countless gatherers of every herb yielding seed, and their custom is to meet on set occasions at stated places and relate accounts of the additions they have made to the stores of human knowledge. It is not every one, however, who has leisure or other opportunity to attend these various meetings; consequently a large proportion of the human race remains unaware of discoveries that render a history of the world as full of novelties as a tale untold.

The nation's progress in science lays down the proposition that the world we live in is a far more wonderful place than fairy land ever was to us. Indeed, the more facts that are ascertained concerning our habitation, the more wonderful it appears; and the more we think of it, or any part of it, the more must we be impressed with the grandeur and majesty of the system in which it is an item. Looking back from the standing point afforded us by modern discoveries into the coiled up centuries that form the dim past, known as "in the beginning," we learn that the earth was once a ball of molten matter of intense heat revolving on an axis in an orbit round the sun. Some minds speculating on the origin of this ball of fiery matter have deemed it possible that the earth and planets are concretions of nebular matter of which the sun was the nucleus; and certain spectrum experiments made by Bunsen and Kirchhoff certainly favour this view, as they show that the sun is in reality composed of materials, some of which are identical with those of our globe. We will, however, confine ourselves to the modern reading of the history of the earth, reserving discoveries relating to the sun for future mention. The ball of heated molten matter revolving in space was also, at the period of our earliest knowledge of it, gradually cooling and hardening. It is tolerably clear that a thick veil of steam must have surrounded this cooling body in its ceaseless round, which, condensing as the heat lessened, settled upon the surface of the crust of the earth in the form of water. This union of water with the scoriaceous covering of the earth commenced the process by which the lowest stratified rocks were formed. A diligent search amongst these primitive formations has failed to show that life existed at this period; but, in the next stage of the world's history, deposits were made at the bottoms of the early seas which formed the assemblage of strata known as the Silurian system, in which are found the remains of myriads of marine creatures and seaweed like plants. The upper strata of this system contain the remains or scaly coats of fishes. The carboniferous strata yield us evidence that insects and reptiles next disported on the face of the globe, fostered and fed by a luxurious and gigantic vegetation. This era in the history of the world is called the Palæozoic, or that of antique life. In the next great period of time the earth was inhabited by enormous animals, that were of similar forms to our toads and lizards: the seas by monsters that were half fish and half reptiles, now called saurians; and the air by enormous winged creatures, also bearing a resemblance to our lizards, called pterodactyls. This is referred to by geologists as the secondary period. In the tertiary period the highest forms of life tenanted the earth, and many of the creatures that belonged to the secondary period were extinct. Elephants, rhinoceroses, mastodons, and other huge creatures of the same colossal proportions, roamed in almost interminable forests; and the ox, horse, and deer have also left evidences of their existence in these remote ages. After the earth had thus slowly passed from stage to stage, and its surface had been inhabited by races of organic beings that were successively supplanted by others in the order in which the conditions required for their existence were superseded, man was created. Modern science has calculated the weight of this orb to be about 6,049,836 billions of tons; the diameter to be about 8,000 miles; and the thickness of the crust formed on the still globular mass of molten matter to be about 34 miles. A subdivision of this branch of modern study and research proves that the earth's surface has undergone considerable physical changes since it became the habitation of man. The presence of the remains of the hippopotamus in districts where not a ripple of water is now to be found; of elephants and rhinoceroses in places where the present climate would render their existence insupportable; the upheaval of land, beaches, and sea-bottoms; the receding of some waters, the encroachments of others, are some of the facts bearing upon this subject that have been noted by observers. It has also been ascertained that alterations in the physical geography of the surface of the globe have by no means ceased, but are still imperceptibly taking place.

Recent discoveries inform us that the earliest human beings inhabiting this shifting scene were rude savages. The remoteness of the era when man first appears upon Nature's stage may be best realized when we consider that the mammoth, extinct species of the elephant, rhinoceros, hippopotamus, and reindeer inhabited Europe contemporaneously with him. His tools and implements were all made of one material, stone: his food consisted almost entirely of game. After a long lapse of time, perhaps of centuries, although stone continued to be the materials of the weapons and tools of these early people, their food began to comprise tame animals, and ultimately cereals were added to their fare. Explorations have been made, on the coast lines of Denmark, in the great heaps of refuse, or Kjokkenmödding, left by people of this period, which show that they also, in these situations, ate oysters, periwinkles, mussels, and cockles. Next we come to archæological evidence that they built themselves homes. Some seventy submerged villages have been counted in the midst of the Swiss lakes, composed of groups of huts built on piles, as many as three hundred huts being comprised in one settlement; no less than forty-six examples of similar, though not identical islands, have been observed in Irish lakes; and within the last few months further examples have been found in Scotland. Bones, hammers, axes, celts, hatchets of serpentine, arrow heads of quartz, fragments of rude pottery fashioned by hand, masses of charred wood, lumps of carbonized wheat, apples, and pears, the stones of wild plums, the seeds of berries, and hazel and beech nuts have been dredged from the Swiss lake dwellings. The bones have been traced to fifty-four species of beasts, birds, and fishes: twenty-four species of wild mammalia, eighteen species of birds, nine of fishes, three of reptiles, and the dog, horse, ass, pig, goat, sheep, and several bovine races. That most of these were used for food is surmised from the circumstance that all the bones that contained marrow were split open. Some of the Swiss villages contain tokens of having been inhabited in the bronze age, or period when a mixture of copper and tin was used for weapons and tools. The Irish lake dwellings yielded evidence of the possession of oxen, swine, deer, goats, sheep, dogs, foxes, horses, and asses, by their ancient occupiers. One hut, found 14 ft. below the surface of Drumkellin bog, in Donegal, measured 12 ft. square and 9 ft. high. It contained, when explored, two stories of 4 ft. only in height. The planking presented the appearance of having been split, with great effort, with stone wedges. One of these implements, a celt, a piece of leathern sandal, and a flint arrowhead, were found in this hut. The exact date of man's first appearance and the question of the quality of the intellectual powers possessed by him at that time are subjects which the scientific world is still discussing. To have ascertained that he was contemporary with the mammoth is a step towards the disentanglement of the first question; and the collection and examination of the remains found in future discoveries will, doubtless, throw more light than is now shed on the latter. The evidence yielded by the examination of those skulls already found is by no means sufficient to be conclusive, though, as indicative of the direction in which the results tend, we may repeat that Professor Huxley exclaimed, on viewing the fossilized cranium of a human skeleton found in a cave in the valley of the Dussell, that it was the most ape-like skull that he had ever beheld. So far as we have gone, modern science pictures our early predecessors as low, thick-set, strong-boned people, with protruding brows and receding foreheads. Ten years ago we could not speak thus advisedly. Another period of ten years may reveal the existence of other depositories whose contents will afford more exact information. Before returning from these dim ages into the modern present we may mention, for the behoof of those of our readers who may hereafter be entrusted with works likely to lay bare such places, that several caves have been found in this country and in Wales containing enormous quantities of the bones of extinct animals and of creatures which no longer inhabit these islands. Most of these caves have fissures connected with the surface through which the bones are supposed to have been washed thousands of years ago. The fissures have become choked, and thus the deposits have been, as it were, sealed up. In the ossiferous loam filling a fissure connected with Bosco's Den, in the Gower caves, in Glamorganshire, the antlers of a thousand rein-deer were extracted and nearly as many more appeared to be left behind. These had all been washed into the rent with the bones of the cave-bear, wolf, fox, ox, stag, and field-mouse, and lay in an envelope of ochreous mud. In a cavern, called Longpole, the remains of two species of rhinoceros were found, below which lay two rude flint knives. Sir Charles Lyell quotes the finding of fossil remains in the basin of the Thames at Gray's Thurrock, at Copford in Essex, at Maidenhead, at a spot near Bromley, in the valley of the Avon, at Pease Marsh, in Suffolk, in Somersetshire, in Wiltshire, in Bedfordshire, and in several other counties.

Of the sun, modern science has ascertained many new startling facts. The dark places on its disk, that we familiarly call "spots," are deep chasms in matter that, as we have seen, is found to be of a similar nature to that of which our globe is composed. The world is indebted to Mr. Nasmyth for a still more startling dis-

covery. This gentleman was the first to observe that the bright surface of the sun is composed of an aggregation of apparently solid forms, each some thousand miles long and hundred miles broad, which interlace each other in every direction. These extraordinary and hitherto undreamt-of bodies, crowding round the sun like a cloud of moths round a candle, are of a long narrow pointed form, similar to that of a willow-leaf, and are so regular as to lead to the inference that they are organisms which may even partake of the nature of life. They are observed to line the sides of some of the chasms, and to form a sort of bridge across others. As some aid to realize the vastness of the field on which these objects are seen, we may give the rough calculation that the circumference of the sun is about twice that of the circle described by the moon around the earth; whilst to convey a sense of the awful immensity in which the sun moves, we may add that its diameter is but a three-thousandth part that of the outermost planetary orbit; and that, in company with our globe and the whole solar system, it revolves round another stellar centre, now believed to be situate in the constellation we call the Pleiades; —and, leaving certainty for probability, that *savans* are disposed to admit that this second sun may be but an item in a still vaster and more distant system. Professor Secchi, of Rome, has ascertained that the heat of the sun is greater at its equator than at its poles. Before we turn from the sun, we must refer to the important prediction made by Sir William Armstrong. He points to the sun as the successor of coal for working our manufacturing machinery. The Falls of Niagara, he indicates, would provide power enough to set in motion all the machinery employed in all the manufacturing processes in the world; and falling waters, raised to the necessary height by the heat of the sun, will be one of the resources future ages will develop for this purpose. Photographs of this luminary have been taken every day that the weather has permitted, for many months, in a room constructed for the purposes of astronomical photography at Kew, by an instrument named the photoheliograph. Not less out of our every-day life, and to the credit of modern science, are the wonderful catalogues of fixed stars made by the Astronomer Royal; or the long lists of luminous meteors made up annually by Messrs. Glaisher, Gleg, Brayley, and Herschel; or the calculations that instruct us to look for showers of those erratic strangers travelling through space at the rate of 17 miles a second, shooting stars, on the 10th of August and other given days.

Professor Phillips, Dr. Lee, and Mr. Birt, have made us so familiar with the geography of the moon that it seems, in a fanciful way, only a question of time before a committee of *savans* be deputed to visit and explore it. They have measured the vast plains, surveyed the chains of mountains, named every isolated peak, noted the craters, the valleys, terraces, rocky ridges, and other variations on its surface, as minutely as though the body were one of our colonies. Enormous plains, one of which they have computed to measure 61 German miles long, stretch away till they are fringed with rocky promontories or checked by precipitous mountain ranges. Craters abound in every direction. Some of the smaller mountains resemble cups set in saucers: others consist of dispersed cups. In the centre of some of the larger mountains, as in those named Copernicus, and Gassendi, are masses of broken rocky country, about 6,000 ft. high, having buttresses which die away in collateral ridges. In another large mountain, named Theophilus, the centre is formed of a conical mass of rocks, 15 miles in diameter, full of enormous clefts, which are bright and shining. The whole aspect of the moon is expressive of volcanic action on a grander scale than that which has prevailed on our globe. A continental *savant*, Benzenberg, argues that shooting stars migrate from the moon.

The ascents of Mr. Glaisher in Mr. Coxwell's balloon must not be passed over in a summary of scientific endeavours. The most consoling result of his efforts to the popular mind is the certainty he has proved that our bodies are not adapted for any other sphere than that on which they are placed: to exist under other conditions we must put off our earthly garment. The scientific experiments tend to negative the conclusions formerly arrived at respecting the decrease of temperature with elevation, and to show that rain is only precipitated when cloud exists in a double layer.

The systematical forecasting of the weather by Admiral Fitzroy, and the telegraphic warnings sent to the various ports, is another most useful and marvellous feature of the day. The system, we perceive, has been adopted in France and Holland.

Modern chemists have conferred several boons, on mankind. They have given the world two new metals—aluminium and thallium; a new alloy, formed of a variety of brass, containing a small quantity of iron, combining tenacity with elasticity to a remarkable degree; new dyes from aniline, a refuse material, that only a short time ago was of no account; new disinfectants, &c.; and have applied a new principle to furnaces. The regenerative furnace of Mr. Siemens is looked upon as an agent likely to revolutionize many a chemical art, from its power of attaining a temperature beyond that of other furnaces, with a greater economy of fuel. Chemists, too, have gone into the great question of utilization of our sewage. Baron Liebig has recommended that the liquid portion of the manure should be mixed with superphosphate of lime, before distribution by pipes over fields, as a process likely to increase the value of the constituents in it. Many an experiment, however, must be made before the key to this question, involving an annual gain of millions of pounds sterling to the metropolis alone, be it remembered, is found.

Sanitary science has grown of late years. A wholesome conviction has come to men's minds that many diseases are preventible; and instead of a blind acceptance of epidemics as misfortunes to which we ought to bow without repining, it is agreed that it is more imperative upon us to prevent the ravages of the slayer, by cutting off all chances of his approach. This has led to anxious consideration of the numerous causes that affect the public health, and given rise to marked improvements of many kinds in many places. Various appliances have been elaborated which formerly were scarcely considered, such as tubing for drains, traps, ventilators, contrivances for the prevention of damp and cold in houses, for warming houses, churches, for cooking, for washing, for scavenage, &c. There is still, however, much to be done in this way. The perfecting of gas-fittings, for instance, is a case in point, as it is allowed that a leakage of a tenth of the whole quantity of gas consumed takes place, as a matter of course, and every person who has passed a cutting in a street must have observed the extent to which gas has permeated the soil. And overcrowding, the greatest of all sanitary grievances, has yet to be dealt with.

Tracing civilization from the days when "the earth was filled with violence," to those when she took up science and art in Greece and the power of framing and administering law in Rome, from the days of the canoe to those of our iron-clad frigates, from the days of the hut-building on piles in lakes to those of crystal palaces, we cannot but be stimulated to fresh exertions. The difference in the aspect of our commercial and social relations since the perfection of our railway system, telegraphic communication, and steamboat service, is familiar to all. The inventions in instruments for scientific purposes are as wonderful a proof of our progress as any that we could name; although, perhaps, certain discoveries, such as the dynamical theory of heat with its bearing on the science of gunnery, are still more fraught with power. The theory of the Messrs. Hawthorn, that the railway service may be performed by stationary engines may be worked out before we are many months older, and the laying of the Atlantic submarine telegraph is a task that will not be left uncompleted. Meanwhile, our every-day building occupations will be all the more interesting when we consider the part the various materials have played in the early history of the world.

Proposed Extension of the General Post-Office in St. Martin's-le-Grand.—The application to Parliament, signed by the solicitor to the Post-office, for increased accommodation to that establishment, comprises the appropriation of the whole of the western side of St. Martin's-le-Grand, up to the Nottingham Castle, in Angel-street, to Bath-street on the west and Newgate-street on the south; besides providing for a direct underground communication underneath the main thoroughfare. It is said to be the intention of the Treasury, when the bill is passed, to erect upon part of the site a new Post-office Savings Bank. Notices are being given to the owners of the premises required.

THE CHARING-CROSS HOTEL.

If the amount of public interest which particular buildings excite, were the measure of their merit, and of their due position in the architectural movement of our time, then a high place should be allowed to several of the works that are at present in progress in London. Amongst these would be found the structure now conspicuous in the West Strand, which forms the front of the railway-station that has displaced Hungerford Market and many surrounding houses. The excitement of the interest, at least in the case of any building possessing real merit, must be considered as fortunate and favourable for the future of architecture. It is something gained when the common passenger is arrested in his route along one of the busy thoroughfares of this metropolis, and by a work which is not remarkable, as in detail, for mere eccentricities, or in general character and style, for contradiction and anachronism with the buildings near it and the world about it. In the Charing-cross Hotel and Railway Booking-offices, Mr. E. M. Barry, aided by some of the circumstances of the site, has certainly succeeded in one of the aims of a good architect, which we have alluded to above, and have referred to often before. He has produced a structure which seizes the attention at once, and not by means that are within the hand of every one, without being architect, who has the whim to be pointed at, but by appliances and qualities that are those of buildings such as are appreciated permanently. It is true that he has not carried into every detail of his work, the skill that he has exhibited in general mass, grouping, and sky-line; but in the interests of architecture, both as the art, and as the profession commissioned by the public, we thank him for what he has done.

The Charing-cross Hotel has a two-fold importance in the architectural movement, just now, which we have been inclined to recognise as in progress. It has importance as an example of its particular class of building; as, in the art, it has that which we have alluded to.

It is a curious fact that we, and architects generally, are discussing the first principles of disposition in planning, of certain different classes of buildings that might seem to have been required often before the present day; but which, the principles, along with the details of plan to be provided, somehow have never yet been clearly set forth in treatise or example. Of course, every fresh structure should be expected to be an advance, as well in capability for serving the purpose for which it was planned, as in its art; moreover, wants are changing and progressive: but there are certain requirements that are the same from century to century,—whether in the church, the theatre, the hospital, the picture-gallery or museum, the labourer's cottage, or the stable; and many of these are only now being inquired into by the profession, sometimes with the aid, and sometimes the opposition, of the public, or of those supposed to be acquainted with the special wants. The truth is that till very recently, objects were not served by buildings planned for them,—or since the time when the objects were not multifarious as at present, and were provided for not inadequately in the broad distinctions, as between the church, the monastery, the college, the guild-hall, the *hospice*, the castle, the town-house, and so forth; wherein, though the distinctive characteristics are not confined to decorative features, there is not the recognition of the great variety of wants observed now, both in the entire structures, and in details of plan of each kind of building.

Within the last few years, the want of well-planned, as also well-managed, hotels for travellers, has been loudly complained of; and it has been perceived that the good management, in a large building,—as "on the American system," or where the conveniences may be the greatest, most time-saving, and therefore best adapted for the day,—requires the special and the good planning. The modern hotel thus, is a new class of building; and the principles in planning it, along with the details of accommodation, deserve our attention when an opportunity of examining any actual work occurs.

With the increase of size of the building, which allows of advantages that have been alluded to, certain difficulties or new requirements arise, as those of lighting the corridors without loss of space, of ascent to the upper floors, and of general *service* and communication. In nearly all planning for buildings to contain many comparatively small rooms that have to be well

lighted, difficulty of lighting the corridors is experienced; and the result is generally a compromise. In the Hôtel du Louvre, Paris, the corridors are much too dark, although there are large reflectors. One of the objections to a dark corridor in an hotel, is the difficulty of distinguishing numbers on the doors. To prevent this objection in the Charing-cross Hotel, Mr. Barry has placed in the top of each door an oblong glazed panel, with the number or the other designation of the room painted on the glass; which material of course is groun l, or not what can be seen through. The glazed panels help to light the corridor. For the ascent of persons, there is, as in the Grosvenor Hotel and other hotels, an "ascending-room," worked by water-pressure. There is a lift close to it, similarly worked, for luggage; and there are numerous other lifts, of the common kind, distributed about the building. The landings of the *service*-staircase are kept 18 in. clear of the wall at the end of the space on plan which the staircase occupies; so that there is in effect, there, a shaft of 7 ft. 6 in. by 18 in. on plan, which besides assisting ventilation at all times, would be of great use should materials for repairs be required to be raised. There is a somewhat similar shaft between the windows of the water-closets and the external wall of the building; and there is a large ventilating-shaft at the end of each corridor. There are, of course, the usual arrangements of speaking-tubes; and the bell-wires are carefully placed to be got at easily when required to be repaired. On each floor there is a serving-room, with lifts; and there is a shaft for dust, with double doors and opening arranged so that the dust does not fall down the actual shaft to the basement, till the door in the room has been closed. and so that, should this door be left open, dust descending from any of the floors above, would not find its way into the room. There will be a coal-bunker on each floor, near the principal lift, to contain 2 tons, and which may be replenished every morning. A cistern, at the top of the building, will contain 17,000 gallons of water; one in the basement will hold 10,000 gallons; and there will be twelve other cisterns for various purposes.

The general plan of the hotel includes a refreshment-room (or rather a *buffet* and restaurant, with distinct entrances) in connexion with the railway-station platform, and having its own kitchen; an end-entrance to the hotel from the Strand fore-court and Villiers-street, and one at the side from the railway-station platform; a coffee-room, 48 ft. square, including recesses, and about 24 ft. in height between the beams or divisions of the decorated ceiling; a ladies' coffee-room, 28 ft. by 16 ft.; a reading-room, 30 ft. square; a board-room, 27 ft. 3 in. by 16 ft., which can be used for reception of distinguished personages, being opposite the entrance from the station; a "tap"; a meeting-room, 57 ft. 6 in. by 22 ft. 11 in.; a smoking-room, 26 ft. by 22 ft. 11 in., having lobbies at each end, and a balcony for the whole length, looking out into the station; a room the same size as the smoking-room, which may be used as a billiard-room; a committee-room, 34 ft. 10½ in. by 23 ft. 9 in., and numerous suites, as well as separate bedrooms. The beds number about 214; and there are, besides, 43 dressing-rooms, some of which might be made to contain beds. There are 17 sitting-rooms. The principal suites are provided with dressing-room, water-closet, and entrance-lobby; and the door from the corridor will have a bell. There are 8 bath-rooms in the building, and 52 water-closets. There are five stories above the ground-line, in the centre of the Strand front, not counting two stories which there are in the roof; and there are twelve bays in that part. There are six of the ordinary stories of windows in the pavilions, in the same front; whilst there are four stories in the roofs of these pavilions. One of the stories is a mezzanine, the coffee-room, reading-room, and some other rooms being lofty. There is also a mezzanine, which does not appear in the Strand front, to part of the general ground-floor. One of the upper stories was an addition to the design, after the building had been far advanced. By this, there were gained 39 bedrooms, 8 dressing-rooms, and 3 sitting-rooms. There are three stories below the Strand level; but, as the ground descends southward, these have many well-lighted rooms. At the south end, there are seven perfectly lighted stories above the ground-level; there is one story below, or in the basement; and there is what might be called yet another regular story, though in part lighted by dormers in the roof, and besides the top attics. The kitchen is here wholly above ground, directly under the station refreshment-room, and the hotel coffee-room, to which, or to the attached serving-rooms, there is communication by lifts. The ground story is 21 ft. in height; the principal floor is 16 ft., and the mezzanine is 10 ft. 6 in.; the floor next above is 13 ft. 6 in.; and the other floors are 10 ft. 6 in. each,—the dimensions being stated from floor-line to floor-line.

Having given some idea of the accommodation provided in the building, we may now describe more particularly the manner in which the plan is arranged, and the building is constructed and decorated. And here, before speaking of the relative positions of the rooms, it should be understood what were the conditions imposed by the ground, and by the space occupied by offices and waiting-rooms in connexion with the railway. The land available for the hotel, and exclusive of the fore-court space, formed two sides of a square, or was in the shape of the letter L; the side next the Strand being very nearly 227 ft. The ground at right angles to this, follows the line of Villiers-street, and is 190 ft. 4 in. in length, not including the eastern porch of the hotel, or the railing which bounds the end of the fore-court. But in the Strand front, the whole of the ground-floor was required for the booking-offices, waiting-rooms, and other appurtenances of the terminus, excepting what might be needed for entrance merely to the hotel: thus the Strand front was, or is now, composed of two pavilions and a recessed centre, each pavilion having a porch, of its entire width, projecting from the lower story, and the centre having a glazed pent-roof to the footway,—the porch to the east belonging to the entrance to the hotel: but before the drawings could be matured, the requirements of the railway company entailed another encroachment to the disadvantage of the hotel; for, a portion amounting to 14 ft. 2 in. of the width of the Greenwich Booking-office, which is part of the recessed centre as appearing in elevation, is really taken out of the width of the Villiers-street ground; that is to say, the latter is of the full width, or depth from Villiers-street, only from the commencement of the roof of the station, to the end of the ground southward. The position of the booking-offices and terminus quite interfered with the proper lighting of the three stories of basement in the Strand front; and it will interfere with their ventilation, excepting what may be got from gratings in the platform of the station. As to the west side of the Villiers-street building, or east side of the station, some openings have been obtained; and on the street side, the basement is well lighted as before mentioned. Moreover, as to the Strand line, and the Villiers-street line, the building might have had to be lighted in part from space underneath a station-roof, as the Grosvenor Hotel is at the Victoria Station, an arrangement to be avoided so far as possible, considering noise of trains and the steam from engines, and that ventilation can be scarcely equal to requirements. The position of the ground for the hotel with reference to the station, eventually led Mr. Barry to decide to leave space between the Strand building, in the upper stories, and the north end of the station-roof, or above the roofs of the meeting-room, smoking-room, and billiard-room. Another way in which the plan suffered was in that there could be no staircase in the Strand front, starting from the ground floor. There is one there, from the first-floor; but it is reached from another staircase at a considerable distance, that is, one in the middle of the Villiers-street line, which is the grand staircase of the building.

The front of the building to the Strand is not parallel with the street. The deviation from rectangularity of the forecourt is concealed in great measure by the Cross in the centre; and the obliquity of line of the front is rather advantageous to the effect from the Strand and Duncannon-street. The length of the line, which includes the entrances from the Strand, two lodges, and the iron railing and stone piers, is 238 ft. 4 in.; that of the Villiers-street end of the forecourt is 95 ft. 1½ in., including the projection of the porch of the hotel, 13 ft., inside dimension; whilst the length of the western line is about 134 feet. The Cross occupies a space in the centre of the forecourt, which has a breadth or diameter of the octagon of 21 ft., including the steps; but with the footway, connected with the steps, the dimension will be about 35 ft.

The porch of the hotel, which projects from the eastern pavilion of the Strand front, corresponds with that which there is to the pavilion at the west, where the exit-way for cabs and omnibuses from the arrival-platform of the station is, excepting that to the former porch, there is a side-flight of steps from Villiers-street, or additional to the approach from the fore-court. Each porch is lighted at the top; through rough plate-glass.

A wide doorway, which has a small porter's room on each side, in what may be called the reveals, leads directly from the porch of the hotel, into a square entrance-hall. Exactly facing the entrance, is a niche in a broad pier which separates the bar-window, on the left, from the entrance to the main corridor on the right. This corridor continues southward, or in a line parallel with Villiers-street and the longitudinal axis of the station, past the manager's rooms, and past the grand staircase on the one side, and the board-room on the other, and past the service stairs and "ascending-room," straight to an entrance to the railway refreshment-room. In the course of the length of this corridor, it is joined by the entrance-way to the hotel from the railway-platform, as well as by a separate entrance which there is for the passengers' luggage, near the "ascending-room." Adding the refreshment-room, the length of the line would be about 184 ft.; though, as will have been understood, the axis of the corridor is somewhat to the right of that of the main entrance and entrance-hall, owing to the encroachment of the railway booking-offices.

The breadth of each pavilion on the Strand side is 39 ft. from outside to outside, the recessed centre of the front being 148 ft. 11½ in. The penthouse-covering to the footway, between the porches, projects about 15 ft. from the building. The centre of the Villiers-street front, or for a length of 87 ft. 10 in., is recessed as much as 5 ft., so as to allow an ample area for lighting the basement; and the two angles of the pavilions enclosing this recess,—whereof one pavilion is that of the Strand front, and the other terminates the plan southward, and contains the kitchen, refreshment-room, and coffee-room as before described,—are treated correspondingly with one another, but differently from the angles in the Strand front. The latter are 5 ft. 6 in. on the face, in the lower story, and are terminated by square tabernacle-stages, and zinc-covered spirelets; whilst those to the Villiers-street recess are 14 ft., and are carried up as square towers, with belvideres above the general cornice-line of the pavilions, and terminated each by a lofty pyramidal capping, the general rectangular space on plan of the pavilion being covered by its own high Mansard and flat-topped roof, hipped at the ends north and south. We have mentioned that there is a mezzanine to parts of the ground-floor of the Villiers-street building. The board-room, in the centre of the front on that side, the refreshment-room, however, and perhaps the hall, are carried up to the full height; though to the refreshment-room at least, there is an upper range of lights, or ventilation-openings, above the long windows. The arrangement of this mezzanine may, however, be understood on looking at that of the windows of the board-room, in the centre of the front, and the mezzanine windows on each side. The third story of the building, counting from the ground line of the Strand front, is also a mezzanine; but it takes that character throughout the elevations, the coffee-room and reading-room being lighted by two stories of windows; and the actual height of those rooms not being distinguishable in the elevations from the arrangement of the story and mezzanine corresponding. A balcony, projecting on very bold stone cantilevers, for rooms of the first-floor, is a feature of the recess of the Villiers-street front; and the three windows of each story of each front of the pavilions are grouped together, and deeply recessed with columns and balconies.

The ground story of the Strand building contains the Greenwich Booking-office, and westward of it, a 10 ft. passage-way for luggage; the North Kent Booking-office, and first and second class waiting-rooms; a Main Line Booking-office, smaller than the preceding; a passage-way, 10 ft. 3 in., for luggage; a cloak-room, of about the same width,—which, though the length is 59 ft., would seem inadequate; the cab exit-way, 14 ft. 7 in.; and the parcels' office, and a superintendent's room. The waiting-rooms and booking-offices seem well arranged, and ample in area, as for the suburban traffic. The Greenwich Booking-office includes two sets of ticket-taking

places and ways through to the departure-platform.

The range of booking-offices and waiting-rooms, or between the pavilions, is divided, parallelwise with the line of front, into two unequal parts, by a wall, of 3 ft. 1½ in., which is only pierced with arches for the communication between two rooms, or two parts in the length of a booking-office, or to make the passage-way. This division becomes the actual external wall, south, of the Strand building, where above the smoking-room and other rooms before mentioned of the first-floor: in other words, there is here vacant space between the upper stories of the hotel building, and the end of the station-roof. The space in the first-floor however, is filled by the meeting-room, smoking-room, and billiard-room, with various adjuncts; and each of these rooms is lighted or ventilated through the ceiling, as well as by the windows which look out into the station under the roof of the latter.

Fortunately, light was obtainable to the western end of the corridor of the Strand building; and there is a well-hole for light, at the angle of meeting of the corridors of the two blocks or parts of the entire structure. The first-floor corridor of the Villiers-street building runs direct from the reading-room, which is in the north-east pavilion, to the coffee-room which is in the south-eastern, passing by the principal staircase, the serving-staircase and rooms, and the "ascending-room," similarly to the corridor below; and it is 9 ft. in width.

In another article we shall speak of the decorative features of the building, and may add to our particulars of the construction.

PARIS.

The river Seine is to receive six new weirs, so as to maintain the depth of water between Paris and Rouen at a minimum depth of 2 *mètres* (6 ft. 6¾ in.), and an inquiry for the purpose has been opened at the Hôtel de Ville, in Paris.

The following is the estimate of the works:—

1st level, between the Andresy lock and that of Meulan	£30,000
2nd, between Meulan lock and the proposed one at Bonnière	57,040
3rd, from Bonnière lock to that of Notre Dame de la Garenne	18,520
4th, from Notre Dame de la Garonne to the lock des Poses	40,640
5th, from the Les Poses lock to that of Martot	5,200
6th, from Martot lock to the Railway Bridge at Rouen	180,000
Total	£340,400

During the past summer considerable alterations have taken place in the Hospice Cochin in the Rue St. Jacques, facing the Observatory. New additional buildings have been erected near the Rue Mechin, on land belonging to the hospital, containing several lying-in wards. These are only to serve alternatively,—that is to say, that one of them will always be left unoccupied, for a certain length of time, to avoid the spread of puerperal fevers.

At the village of Ivry a new hospital for incurables is about to be constructed on hospital lands extending over 43½ acres, and will replace that establishment which is now lodged temporarily at the Caserne Popincourt. It is also proposed to erect at a later period at Ivry a similar hospital for the accommodation of females, to be substituted for the establishment now in the Rue de Sèvres. These two establishments are to be *de facto* separated as regards the buildings, but so united by proximity as to be under the control and services of one staff centrally disposed.

Some of the contractors rebuilding the demolished houses, and running up quickly new mansions, have hit upon an ingenious way of raising materials to the top of the scaffold. As the head of water at the Villette is enough to command any of the houses in Paris, they have simply a pipe turned on from the main up to the top of the intended structure, and by that means can fill a bucket or large tub, which, in descending, draws up a plateau on which the materials are placed. The water being turned into mortar, and otherwise made use of afterwards below, is not lost. Some of the materials are also hoisted by Lenoir's machine (by gas); there is one at work at the Rond Pont de Courcelles, close to the Avenue des Ternes. It seems to be, by timing a weight ascending a certain height, about 2½-horse power. The absence of boiler in these engines is a strong argument in favour of employing them where steady slight power is required. At all events, if they are not endowed with the abundant force of a steam-engine, yet in towns and in confined streets, where only a moderate source of power is required to act in a small compass, noiselessly and without nuisance, we have seen that the required mechanical effect can be accomplished without risk of explosion, and consequent damage and loss of life, either to owners or their neighbours. That is something, at all events.

The following new works have been declared of public utility:—

1. The construction of a new post-office on that plot of ground bounded by the Rues de Rivoli, de Mondovi, Saint Honoré, and Neuve du Luxembourg.

2. The prolongation of the Rue de Mondovi as far as the Rue Saint Honoré.

3. The suppression of that portion of the Rue Mont Thabor which lies between the Rues de Mondovi and de Luxembourg.

The new Hôtel des Postes is to form a vast parallelogram, bounded on the north by the Rue Saint Honoré, on the east by the Rue de Luxembourg, on the south by the Rue de Rivoli, and on the west by the Rue de Mondovi. Within this space will be included the western portion of the Rue Mont Tabor, the Caserne de Luxembourg, and the Eglise de l'Assomption. This church and the neighbouring barracks had a common origin, having both been built in the seventeenth century by the *religieuses* called *les Dames de l'Assomption*. The buildings of the barrack accommodation were the property of the order. The church as it stands, is fronted by a portico with eight Corinthian columns; its interior is circular, and is decorated with four arches, between which are Corinthian pilasters, which sustain the circular cornice. This is capped by a cupola 68 ft. 11 in. in diameter. The intrados of the dome was ornamented by Charles de la Fosse, with a great fresco, representing the Assumption. Honasse, one of the best of Lebrun's pupils, Niel and Antoine Coypel, Jacques Stella, and François Lemoine, co-operated in the decoration of this church. Though the style of this building is far from being irreproachable, yet we would fain see whatever is worthy of being preserved well taken care of under its new masters. It would make a splendid sorting-office, whereas its new destination seems to be that of a record or archives depôt.

OZONE AND REFUSE.

At the last meeting of the Herefordshire Antiquarian Society, the president Mr. William Aston, said, when considering the atmospheric condition of the city of Hereford, we are indebted to a gentleman resident here, Dr. Kemp, who, in a contribution on the subject of ozone, at the Bath meeting, very properly reprehended the local practice of accumulating deposits of street sweepings and other offensive matter in the neighbourhood of our public thoroughfares. His remarks and experiments on the nature of ozone are very important to the salubrity of this city, and the peculiar tests for ozone and its neutralizing power in relation to the gaseous products of effete animal and vegetable matter (which tests he has been at considerable trouble in proving), are of a most interesting character, and his conclusions will well repay perusal and consideration. It is to be hoped that the future extension of rational and scientific knowledge will teach civic authorities the baneful effects of these nuisances, and prevent thoughtless errors in matters which have so important a bearing on the general health of the community.

At the close of the meeting, Dr. Kemp, after explaining the nature of ozone, and how it may be detected in the atmosphere by experiment, proceeded to make some practical remarks, bearing upon the health of Hereford, and to which the public authorities, in his opinion, ought to direct their attention. He mentioned, that in the course of the summer he had made experimental observations with respect to this peculiar condition of the atmosphere, in Widemarsh-street, the Bartonsham, and on the tower of the cathedral. He said, it would be remembered, that during last spring the neighbourhood of Widemarsh-street was particularly unhealthy, in the outbreak of scarlet fever, and other epidemics, which no doubt arose from some property in the atmosphere which was unfavourable to animal life, and the result of their experiments showed, that during this time there was a complete absence of any sign of ozone in that locality. He next spoke of the Castle-green, and animadverted upon the circumstance of the adjoining ground being the receptacle for all the filth of the city.

THE ARCHITECTURAL ASSOCIATION.

The usual meeting of members was held on Friday evening (the 25th ult.), at the house in Conduit-street. The chair was taken by the president, Mr. Christian.

The minutes of the last meeting having been confirmed, the following new members were elected:—Messrs. Thos. H. Myers, 11, Oakley-crescent, North Chelsea; Chas. Shoppee, 61, Doughty-street, Mecklenburg-square; W. J. Cooper, 24, Doughty-street; J. Mathew Byrne, 26, Honiton-street; J. W. Lyon, 13, Berners-street; Edwd. Crosse, 46, Carter-street, Walworth; Saml. H. Hope, 10, Ampton-street, Gray's-inn-road.

Mr. Ridge, the hon. secretary, read a report of the Bristol Society of Architects, in reference to the School of Arts established in connexion with the Society.

The Chairman said that it appeared from the report just read that the Bristol society had placed their School of Art on a much larger footing, and proposed to carry it out for a much smaller fee than the Architectural Association was ever likely to do. They ought to take a lesson from the excellent example thus set them. When Bristol had done so much, London ought not to be found lagging behind.

Mr. Ridge then read the report of the general committee on the establishment of a School of Architectural Decoration, to be called "The School of Art accessorial to Architecture." It stated that the school was proposed to be established in consequence of the evident necessity to the architectural student of a better state of art teaching with respect to accurate drawing and modelling of the human figure, and of animal and vegetable forms, in their application to architectural decoration. The business of the school should be conducted by a committee, consisting of the Presidents of the Institute, of the Architectural Museum, and of the Architectural Association, and of ten members; four to be appointed by the Institute, three by the Architectural Museum, and three by the Architectural Association. The course of instruction should embrace drawing and modelling of organic forms, with a view to the obtaining of accurate knowledge of their structure so as to enable the student to apply them in architectural decoration with power and truth. The committee should supply casts and appliances, and when the instructors and visitors reported that a sufficient number of pupils were capable of studying in the life-school, the life-model should be provided, under such regulations as the committee might define. Prizes should be offered for the best works done in the session, as tested by examination.

In pursuance of the recommendation contained in the above report the following were appointed to act as the committee on behalf of the Association:—the president, *ex officio*, and Messrs. Ashpitel, Burges, and Tarver.

The annual report of the Association, embodying its transactions during the session 1863-64, was then submitted and adopted, as were also the accounts and balance-sheet for the past year.

Mr. Tarver read the report of the Class of Design, which was adopted.

Mr. Spiers moved a resolution to the effect, that the syllabuses of the classes of the Association ought to be submitted to the committee of the Association before being printed in the journals. He complained that the class of design had adopted as their subject for this year a large church or cathedral in the Mediæval style, to the total exclusion of the Classic style, and of any other subject in any style whatever.

Mr. Lemon seconded the resolution. He considered it absurd that the plan of a cathedral should be sent in, and perhaps six months afterwards the elevations.

Mr. Blashill and other members expressed their opinion that a mistaken course had been adopted by the class in question.

The resolution was put and adopted unanimously.

Mr. Lewis read the report of the curators and librarians of the Association for the session 1863-64, which was confirmed.

Mr. Blashill read the report of the delegates of the Association to the Architectural Alliance, in reference to the professional practice and charges of architects.

The report was ordered to lie on the table, the discussion on it to be taken at a future meeting.

Some routine business having been disposed of, the meeting adjourned.

DAVID ROBERTS, R.A.

ART ARCHITECTURAL in England has lost a great man. England (Scotland properly) has lost her Canaletti. The fine eyes for transferring architecture to canvas that David Roberts had can see no more,—one of the five or six Scotchmen whom the Royal Academy of Arts in London has condescended to admit among the favoured forty is dead.

David Roberts was born at Stockbridge, near Edinburgh, on the 24th of October, 1796. In what way a love of art came upon him he could not tell. The noble scenery in and around Edinburgh:—

> "Edina, Scotia's darling seat,
> All hail thy palaces and towers!
> Where once beneath a monarch's feet
> Sat Legislation's sovereign powers,"—

has kindled many a poet, and in David Roberts created an inimitable painter.

David Roberts, like his friends David Wilkie, William Allan, and John Burnet, acquired the first lessons of art in the Trustees' Academy at Edinburgh,—an institution, supported in part by Government, for the improvement of manufactures and designs in art. He began as a house-painter, and in coating and re-coating, and in graining on Edinburgh coach and house panels, obtained that mastery of hand which he was soon to turn to a nicer and more profitable use. His skill was soon discovered. Murray, of the Edinburgh Theatre, found for him employment and developed that talent which Mr. Macready, in after-life, and in London, was proud to employ both at Covent Garden and at Drury Lane.

In the year 1822, young David, then in his twenty-sixth year, made his way to London, with a skilled right hand, a strong Scottish accent, and a dogged determination of purpose to succeed, which never forsook him. Unlike David Wilkie, David Roberts was long in becoming known. There was no "Village Politician" for a first picture, no "Blind Fiddler," to follow, with our *second* David from Scotland. He did not at once become famous.

One of his early associates in London was Peter or Patrick Nasmyth, our English Hobbema. David, of twenty-six years of age, carried a letter of introduction to Peter, and was prompt in trying to deliver it; but Nasmyth was not so readily found: found, however he was, at last, and in his favourite "howff" (public house), close to the archiepiscopal Palace of Canterbury. David and Peter were at once friends. Mr. Roberts possessed, and was fond of showing, a little picture by Peter Nasmyth for which he had refused—three times over—many hundreds of pounds. It had cost Roberts little, but was precious, and deservedly so, in the eyes of a true artist and a true friend.

Will the reader pardon in this place and at this time a gossiping story which the writer of these "In memoriam" lines derived from the lips of his honoured and lamented friend? Nasmyth, it is well known, led a hand-to-mouth life, and was constantly in want of money. His art-patrons were the Lambeth pawnbrokers, and Peter had a constant friend with three (two-to-one) balls at the Surrey foot of Westminster Bridge, over against Astley's. "Peter Nasmyths," some fine, others hurried, were there to be seen, and were seen by us (in our boyish days). Roberts, in a careful Scotland-yard and Scottish mood, remonstrated one morning with Peter on the "lowering" of his art, and recalled Peter's attention to the pawnbroker's display of Peter's art. The question and reply on the part of David's friend are alike amusing and suggestive. "Are they outside or inside?" was Peter Nasmyth's question. "Oh! they are in," was David Roberts's reply. "Then," continued Peter, "it's no matter; but, had they been out, I—I wadna hae liked it."

Mr. Roberts, like his friend Mr. Clarkson Stanfield, went *against* "The Royal Academy of Arts" in London, and sought public favour in the Society of British Artists, in Suffolk-street. He was soon distinguished, and was courted for in Somerset House. Nor was he long in yielding to solicitations. He became an A.R.A. in 1839, and a full Royal Academician and Esquire in 1841. "If to become a Royal Academician is an honour," said John Martin, "Roberts deserves that honour. Roberts has a fine eye—he sees well, and can make others see what *he* sees." No mean compliment.

Mr. Roberts was a loving Scot at the heart's core. When, in 1858, he returned, with Stanfield, from a trip "due north," he bore away with him a heart full of affectionate warmth to his native land. The Royal Scottish Academy gave, in true style, a dinner to "Davie and Stanny." The late Sir John Watson Gordon (Raeburn's worthy representative) was in the chair, and David Roberts was King David Bruce on that day.

Rehear, Land o' Cakes and brither Scots, what a fine-hearted man, and a skilled painter, said on that occasion:—"I feel almost, for the first time in my life, at a loss for words to say how much I am sensible of the honour which you have this day conferred upon me. It is the fortune of a great many of my countrymen to leave Scotland and to look to other lands for the purpose of bettering their condition; but there is one thing that they never forget, and that is their love of country. Wherever a Scotchman may be,—in whatever distant lands his lot may be cast,—he always remembers those early impressions which he has received at home; and if there is one desire that is more permanent than another, it is the desire to do honour to his native land. Few—very, very few indeed—return to the place of their birth to receive such an honour as has been conferred upon me this day,—an honour which, as I have already said, I am utterly unable to acknowledge in adequate terms. In a former speech your lordship [the Provost] alluded to my early life, and to the few advantages which I enjoyed while in this country. I have had that which is the birthright of every Scotchman—a good religious and moral education. Early in life I was taught the duty of respect to my superiors; but while giving them all due honour I was also taught never to forget that self-respect which belongs to every honest man. If I have risen in life from humble circumstances, and from a humble position, I hope I have done so with honour, with integrity, and with probity; for whatever country a man may belong to, if these things are kept in view, he will never want friends. I have certainly through life met with many friends; and I very rarely, if ever, lost them. The same principles which have guided me I am sure guide thousands of my countrymen; and if I, a humble apprentice boy, from this my native town, have, by adopting these principles, risen to the highest distinction that can be conferred in my profession, I trust that others, such as I then was, may be incited by an honourable and laudable ambition to follow out the same principles of integrity and honour which must ultimately lead to their advancement in life; and if my acceptance of this mark of the respect of the city of Edinburgh should be an inducement to the apprentice boys of Edinburgh to persevere in a course of laudable and honourable conduct, in their names I accept this honour, and with gratitude return my sincere thanks to you for it. I hope I shall never disgrace this burgess-ticket; I am sure I shall always prize it and do honour to it. Your lordship has alluded to my presentation of a picture to my native town; but I am aware that I have only done that which hundreds of Scotchmen would have been very proud to do if they had been placed in my position. I believe that the arts confer a great benefit on mankind. I am sure that the contemplation of a beautiful picture, whether it be a landscape or a representation of an historical event, must tend to raise the mind to better and higher objects. I believe that the contemplation of a picture in a national gallery appeals to the most uneducated as well as to the best educated and most cultivated minds; indeed, I believe that it has more influence on society than most of us are aware of. I should like to see a national gallery in all the principal towns of my native land. There are thousands who can understand a picture that cannot understand an epic poem, and the influence which a beautiful picture has upon mankind is probably greater than the world is aware of. In that belief, and with that feeling, I presented to my native town a work, of which I shall only say, that I wish it had been better. But, at all events, I hope it will be preserved, and that it may do something towards carrying out that great object which the Scottish Academy have in view, by directing the attention of the citizens of Edinburgh to the promotion of the arts which confer so much good upon society, and which must make us better and wiser men. I again say, that I feel a total want of words to express my sense of the honour which has been conferred upon me; but, wishing success and prosperity to the city of Edinburgh, I thank you for it from my heart."

David Wilkie sent David Roberts to the Holy Land, and both "unlanguaged" carried with them their Scottish tongues and their Edinburgh printed Bibles. The *two Davids* returned with different mental wealth; but both have left—David Roberts especially—noble and enduring monuments of what they saw.

David Roberts should be buried in St. Paul's, near to Sir Christopher Wren and his old artistic enemy and friend—J. M. W. Turner.

FRESCO-PAINTING, AS APPLIED TO THE DECORATION OF ARCHITECTURE.

A PAPER on this subject was read by Mr. J. B. Atkinson at the second meeting for the present session of the Bath Literary and Philosophical Association.

At the outset Mr. Atkinson said he proposed to treat of the relation and reciprocity that might exist between the two arts of painting and architecture. Architecture had been rightly deemed the parent art, whence had sprung, and around which had clustered, the subsidiary arts of sculpture and of painting, as the offspring of the more ancient stock. This family bond of a common birth long held in union even the remote and collateral descendants, content to be housed in concord under one roof. Thus painting was, among ancient nations and in early epochs, always found clinging close to architecture, the very ribs and body out of which it had first sprung. Thus the temples and the palaces of India, of Asia Minor, of Egypt, of Greece, and of Rome, were adorned by paintings which, as faithful allies, sought to enhance the majesty and the beauty of the original master-work. But in the lapse of time schism came to mar this happy union. A Babel uproar of conflicting styles and schools had torn and tortured the once united polity of the accordant arts. Painting, in particular, in her severance from the central stock, had become itinerant and vagrant, had lost in dignity just as much as she might have gained in freedom; and, on the other hand, architecture, denuded of her ordained decoration, instead of being clothed in colour was shrouded in whitewash.

It was the object of that lecture to join once more those arts which since the Middle Ages had unhappily been divorced; to show upon what terms a reconciliation might be effected; to point out what surrender of antagonism must be conceded, so that the varied modes of painting, among which fresco was the chief, might be made, now again, as in all prior epochs, conducive to the harmony and the splendour of architectural composition. He had chosen fresco, because of all the processes of mural decoration it was the one in which the painters of the Middle Ages chiefly delighted; it was the method that had transmitted to us the grandest creations the world had yet known. Notwithstanding the failure and premature decay of the mural paintings in the Houses of Parliament, he still firmly held to the opinion that the ancient process was not only noble and architectonic, but that when executed with knowledge, and with due care in the use of materials, fresco paintings might now in England, as in Italy of bygone centuries, be rendered enduring as the wall and tenement they were designed to decorate.

It might seem little better than a truism to declare that the purpose for which a building was designed must regulate the character of the pictorial subjects employed in its decoration. It would at once be evident that a church for worship, a hall for legislation, and a house for domestic uses, would each call forth distinct and appropriate trains of thought, which, like visions, might be emblazoned on the walls. The devotee of the Middle Ages knelt in a side chapel of the Florentine Church of La Trinita in the presence of a fresco picture representing the death of holy St. Francis. Again, the Podesta, or chief magistrate of the Tuscan Republic, they were told by Vasari, was surrounded in his hall of state with a grand composition by Giotto, the figure of the commune seated in the character of a judge, with a sceptre in his hand, and scales equally poised over the head to indicate befitting rectitude in his decisions. And then, if they turned from the solemnity of the Church, and the dignity of the state, and entered within the sphere of domestic life, they found that Agostino Chigi, the Roman banker, of the sixteenth century, called to his aid Raffaelle, Giulio Romano, and Giovanni da Udine to adorn the stanze and loggia of his palace, now called the Farnesina, with the poetry and romance of the Grecian Parnassus: so that visitors walking in at the garden door were greeted by Venus, Psyche, Cupid, and the Graces; and guests

seated at the table might gaze at Galatea floating in her shell drawn by sportive dolphins. Religion should inspire the decorations of the Church; patriotism should ennoble the adorning of our halls of justice and legislation; poetry should bring to our private dwellings the charm of beauty, and invoke the spell of imagination. Remarking, in passing, that the Church had extended to painting and architecture, the most munificent of patronage, the lecturer went on to observe concerning the choice of a subject, that of the subjects chosen by painters for the decoration of architecture, the boldest, the grandest, and the most imaginative were perhaps Michelangelo's frescoes in the Sistine, and Correggio's frescoes in the domed churches of Parma. He could see no objection to the repetition of Raffaelle's cartoons along the walls of a country church, and he knew of no reason why the artist who had succeeded in making a broad and bold translation of these compositions for one building might not be employed in the multiplication of the same works until every county should possess at least one church so adorned.

The practice of mural decoration once instituted, monotony might easily be made to give place to variety. The difficulty was to render mural painting popular and widely diffused, at once economic in cost and excellent in style. For that end it would be desirable that several series of subjects should be designed by the first artists of the day. These drawings might become through purchase or premium the common property of the profession and the country, and so be disseminated as cartoons which merely manipulative artists could transfer to the walls of a sacred edifice. In all monumental painting it must be remembered that the artist who with fewest touches, fewest colours, and fewest figures, would tell his story was best qualified for the task of mural decoration. What had been said of subjects suited to a church, would, in a greater degree, supersede the necessity of adding much on the secular side of the question. What might be said of a national palace would stand good for a municipal town-hall. In the chief building of a provincial city national themes naturally gave place to local chronicles, and hence the topics sought after were those which had conferred honour on the locality, or which recorded the virtues of illustrious citizens. Again, the interval between a municipal building and a private dwelling might be wide, yet the essential principles which lay at the root of all mural decoration were subject to little change, and indeed might be pronounced all but immutable. Of private mansions he might safely declare that just in proportion as the mural paintings had less of state and historic import, so might they enter upon the realms of poetry and usurp the regions of imagination. Reception and banqueting halls should be festive and sumptuous; and he knew of no scenes which responded more warmly to hospitality and good cheer than those that the Italian painters borrowed from ancient mythology. He feared, however, that the time was still far distant when English noblemen would emulate the example of the princes of Italy. He trusted that ere long the arts of painting, sculpture, and architecture might receive from the Universities the recognition that would bring to those centres of learning commensurate reward; and then, when the graduate returned to his ancestral domains, he would carry with him knowledge that might direct and inspire the village Phidias and Apelles; and, failing the power of original creation, cunning hands would not be wanting for the transfer of figures from a Greek vase, or for the adaptation to a frieze or panel of the designs of Flaxman.

To sum up the whole matter in reference to the choice of a subject in brief, he would say: "Let the topic chosen commend itself by its simplicity and dignity: cast out from it every figure, incident, or detail which militates against grandeur of effect, or singleness of aim: let the facts expressed have the stability of the structure they adorn; and, above all, let the style, removed above ordinary nature and commonplace, severe, and even stern, reach to a generic type, and be redeemed by its elevated truth and beauty: thus, and thus only, can painting aspire to become the equal and honoured associate of architecture."

Mr. Atkinson next considered the conditions which should govern the composition and treatment of the subject chosen, and spoke strongly against the fitting in, as it were, of frescoes into limited spaces, after the style of a picture-gallery. Architecture, he felt, had reason to complain of the injury she had received at the hands of her sister, Painting. Architectural forms had been but too often violated for the sake of a florid display of colours, and a rampant assemblage of pictorial forms. The question claiming consideration was how a pure and holy alliance may be maintained between painting on the one hand and architecture on the other—an alliance and an allegiance which shall prove equally to the honour and welfare of each. In the interest of that amiable union mutual concessions must be made. Painting, on the one hand, must learn to be monumental; and architecture must submit to be decorative. Lastly, Mr. Atkinson proceeded to lay down some of the leading principles for the use of fresco painting as a means of colour. Colour had often proved to architecture a snare. Rich marbles, gold and other glittering and precious materials, had frequently corrupted purity of form, and given in exchange but barbarity of grandeur. To escape that abuse, colour must be employed in strict subjection to structural fitness. It must serve to build up, not to seek to undermine, the edifice to which it should cling as an ally, not attack as a foe. For this aid it must assist to develop form, it must enhance light and shade.

The lecture was illustrated by chromolithographs and engravings of various specimens of fresco painting.

THE BASINS OF THE ST. OUEN DOCK COMPANY.

On Sunday, the 13th ult., took place the inauguration of the great basin, and the launching of one of the floating warehouses of the Saint-Ouen Railway and Dock Company. In spite of the rain, which never ceased to pour in torrents all the day, a vast concourse of persons assembled to witness the ceremony. This company, entitled La Compagnie Anonyme du Chemin de Fer et des Docks de Saint-Ouen, with a capital of 400,000*l*., has executed immense works around the ancient station of St. Ouen, with a view of uniting, on the same level, at Paris, the *réseau* of all the railways with that of the navigable canals. The St. Ouen Railway starts from the Chemin de Fer de Ceinture, traverses the fortifications,—the rampart by a tunnel, and the moat by an iron bridge,—passes the route De la Révolte on a level, and ends at a spacious goods station. Here the lines of railway divide into innumerable segments, in all directions, by means of turntables, and present a united development of about 2,200 yards. These are so disposed that the waggons and boats can transfer conveniently and directly merchandise from one to the other at suitable quays and under roof. The large basin is 9 ft. 10 in. deep, from 164 ft. to 492 ft. broad, and measures about 13a. 2r. 14p. in area. The wall surrounding the dock is of solid masonry, built vertically, and is in development about 2,200 yards. Behind this are sheds, stores, and warehouses, accessible by rail, water, cartage, or any conveyance imaginable. This magnificent piece of water communicates with the Seine by means of a lock, 197 ft. long by 39 ft. wide. An avenue, 65 ft. 7 in. wide, and 650 yards long, communicates with the west of Paris by the Avenue des Batignoles; another will lead to the east of the town through the Boulevart Magenta. The warehouses and *halles* of the Saint-Ouen-Paris Dock Company will, when completed, compete with those of London or Liverpool. They are to consist of, in addition to the depôts, magazines, and platforms of the ancient Saint-Ouen station, a variety of immense constructions, all fire-proof, built with wrought and cast iron, bricks, and stone, occupying nearly fifty acres of ground. These are to be—1st. A loading and unloading quay, between the canal and the rail, 547 yards by 26 ft. 3 in., with twenty powerful cranes, and roofed over. 2nd. Warehouses five stories high, presenting 59,800 square yards of flooring divided into 500 chambers, each of 119·6 square yards, for dry goods of all sorts. 3rd. Floating warehouses, of which two are already in the water, and three more are being constructed. These consist of a group of 100 cylindrical wrought-iron tanks, each holding 5,500 gallons—in all 550,000—admirably adapted to contain oils, spirits, petroleum, &c., or any inflammable liquid. These are moored in the centre of the basin, free from all risk from fire. In case of danger, they can be at once drifted into the Seine. 4th. A storage platform 547 yards long by 29 ft. 6 in. broad, forming a surface of 1a. 0r. 18p., and capable of maintaining 500,000 tons per annum. 5th. Behind this platform a covered roadway of the same length, and 26 ft. 3 in. wide, forming a surface of 4,784 square yards. 6th. Between this covered way and the street circulating the exterior of the docks, and forming the ground-floor of the warehouses, 131 arches each, being 13 ft. 2 in. wide, 16 ft. 5 in. high, and 26 ft. 3 in. deep: these are to be apportioned thus—six near the entrances for guards, &c., and the arrival and despatch offices, twenty-five for the custom-house officers and commercial agents, and 100 to merchants. 7th, and lastly. On the third story of the warehouses, five large halls for counters, with a glazed gallery to contain specimens and samples of all sorts. All the above described structures are grouped together round the basin, and are capable of holding in stock 50,000 tons at a time of merchandise of all sorts. The whole of this work has been designed by M. Préfontaine.

YORK SCHOOL OF ART.

The annual meeting of the subscribers and friends of this school has been held in the Institution. There was a numerous attendance, and Lord Houghton occupied the chair.

The Chairman, in course of his opening speech, spoke of the question of payment to schools for results. His lordship said, that when he was a member of the House of Commons, he took a different view from the Government, as he did not believe such a provision could be advantageously carried out. He thought that some consideration should be shown to teachers in this and such establishments, not only as to their material advantages, but as to their moral position; and it appeared to him, that a master either in the school of letters or of art, who has to depend on anything so fluctuating as the intellectual results produced on the minds of his scholars, feels an uncertainty of position, and therefore a discomfort of mind, which, in nine cases out of ten, incapacitates or weakens the capacities of such a master. Whatever rules were established, however, by the department to which he had alluded, he hoped they would submit to them cheerfully, and make the best of their position, even though they did not like it.

Reverting to the general question of the advantages of schools of art, even to those who were not artists, he said the topic was one upon which he could enlarge for some time, because it was very cognate to one in which he had himself taken considerable interest. There seemed to him to be a great analogy between the art of design, as prosecuted in that school, and poetry, to which he had given some little study. He had felt from his own experience, and had said to others, that he believed one of the great advantages of the study of the art of poetry was not the desire of becoming a poet, or succeeding in so wonderful and difficult an art, but that it enabled them to cultivate their own faculties and nobler perceptions, and they would find, that any man who could write decent verse would be likely to write good prose, and be otherwise a man of general culture. So it was in application to art. A boy taught to draw well, correctly, precisely, would find it of advantage in after-life, even in totally different and distinct pursuits. In his moral culture, in the punctuality of his habits, even in the cleanliness and decency of his person—in all these things the boy who had cultivated the study of art would find advantages in after-life, even although obliged to give up the pursuit of art altogether. He thought, too, that these studies acted most advantageously upon the general and moral well-being of the country. They might all see with satisfaction that there had been of late years very great progress in the general artistic tastes of the people. Just look at the number of engravings and good pictures found in all sorts of places, even in the houses of the very poor. Look at the general improvement in the decoration and architecture of their towns. Look at the increased enjoyment various localities experienced almost every day in the exhibition of their own magnificent works of art; and they need have no stronger instance of this progress than in the interest which that city had taken in opening out their glorious Minster, and exhibiting it after so many ages in something like its true grandeur.

Mr. J. Swallow, the master, spoke of what had been done by schools of art,—adequately supported. It is scarcely possible, he remarked, to

estimate the exact amount of resultant good that has been attained. Many of the rising artists and architects have received some part of their education in these schools. It is evident that great improvement has been visible since their establishment, and more especially in art manufacture. How much of that may be due to French influence I cannot pretend to state; but we must not forget that formerly all our designs were imported, or were of foreign origin, and that we are now in many departments of our manufactures indebted to them. But, on the other hand, we know that the schools of art have had a beneficial effect on the educational taste of the country. They have assisted to develop dormant tastes in the people and amongst art-workmen. English damask has been much improved. The Norwich shawl manufacturers almost entirely rely upon English designs. Mr. Clabburn, one of the principal manufacturers, thinks our shawl designs are equal to the French. It is admitted that in the Potteries there are now many hundred young men who can draw intelligently and well, and who have improved their position. Pressers and moulders have become modellers. Gilders attend the School of Art to become painters, and so on. English pottery designers have greatly improved, but are said to be still inferior to foreign modellers and painters. In the Nottingham lace, the case is altogether the reverse, and the French are said to pilfer the English patterns. Sheffield is noted for its designers in metal work. Birmingham, Edinburgh, and some other schools have a deserved reputation. There is also improvement distinctly marked in glass, furniture, and other trades. Nor must we forget that the wide-spread teaching of mechanical drawing in the schools must be of great advantage to engineering workmen, in enabling them to make working drawings, and to intelligently carry out those of others. These, then, are some of the advantages already conferred by schools of art.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

AT the first meeting, held November 23rd, Mr. Godwin, V.P., in the chair, the Chairman called attention to the prosperous condition of the Association, and referred to the success of the Congress held at Ipswich in August, and the great attention paid to the objects visited, and the members present, by the President, Mr. George Tomline, M.P. Many new members had been added, but the Society had unfortunately experienced a great loss by the decease of the Duke of Newcastle, K.G., Mr. Hudson Gurney, and the Right Hon. Thomas Erskine, zealous associates. The Congress for 1865 had been arranged to be held in August, at Durham, under the presidency of the Duke of Cleveland. A list of thirty-five new associates was read. Mr. Syer Cuming, in laying before the meeting a variety of pseudo antiques cast in lock metal, reviewed the steps taken by the Association in regard to the detection of these forgeries, proceeding to trace them as springing from an idea in France, its development in this country, and its extraordinary progress in objects in lead. The sale of these, from the various exposures, particularly by the trial at Guildford (Eastwood *v. Athenæum*), for publishing a report of the proceedings of the Association, rapidly decreased. In 1863 came forth casts in lock metal, a composition of two parts copper and one of lead; it melts at a low temperature; and in plaster of Paris moulds have been produced spear heads, daggers, celts, &c.; some of considerable size. Mr. Cuming exhibited several of these, and as the trade still flourishes, repeated his caution to antiquaries on the subject. Mr. Gould, Mr. T. Wright, and others confirmed Mr. Cuming's statement, and gave examples in illustration. Mr. T. Wright exhibited some pieces of Greek Samian ware from Tarsus, in Cilicia, and pointed out their resemblance to the red Samian pottery of the Romans found in Britain and Gaul. A letter from Mr. Thompson, of Leicester, was read, announcing that under the direction of the Leicestershire Society important excavations had been commenced at the mass of Roman masonry in that town known as the Jewry Wall. Dr. Brushfield forwarded a paper on Roman Intaglios, discovered at the station Petriana, on the great north wall of Hadrian. They were six in number, and impressions of them were exhibited. Two were gnostic seals in sardonyx, the others in red composition and in blood stone. Lord Boston exhibited a portrait of Henrietta Maria, upon paper spread on an oval panel, and attributed to Sir Peter Lely, but bearing a close resemblance to one of Vandyck's pictures of the queen.

Mr. Planché read a paper on the "Nine Worthies, Male and Female," in illustration of a series of curious paintings on panel, in Amberley Castle, Sussex, referred to in our pages recently, and which were thought by Dallaway to be allegorical representations of Flemish provinces. After giving several lists of the nine worthy men and nine worthy women, all varying one from the other, not only in the names of the personages, but in the coats of arms absurdly attributed to them, and, therefore, showing that no dependence could possibly be placed upon the integrity or congruity of any particular series, he referred to a catalogue of French worthies in Andrew Favine's "Théâtre d'Honneur," published in 1620, consisting principally of Queens of the Amazons, who are therein described as bearing armorial insignia generally resembling, and in three instances identical with, those painted on the shields of the armed and crowned ladies portrayed on the Amberley panels. Mr. Planché exhibited photographs of five of these pictures, and described from Mr. Gordon Hills's account the three remaining perfect. A fragment of a ninth had since been noticed by Mr. Hills, who is engaged in the restoration of the church adjoining, confirming Mr. Planché in his theory respecting them. The name of Cassandra had been deciphered under one of them, and the word "Babylon" under another. Cassandra was not included in any of the lists the reader had seen; but Semiramis, Queen of Babylon, was mentioned in two of them. It was very probable that the painter had substituted the celebrated prophetess for some other illustrious personage, although the rest of the inscription was too illegible to render it clear by the context that the name actually applied to the portrait. The main object of the paper was to show that nearly every author selected his own nine worthies, and that the painter of these panels must, from the very remarkable character of the coats of arms, have been acquainted with some catalogue closely resembling that which has been preserved by Favine.

THE LIFE ASSOCIATION OF SCOTLAND ASSURANCE COMPANY.

THE extensive and costly pile of buildings styled the Life Association of Scotland Chambers, having been just completed, the office was opened for public business a few days ago. The site selected for the structure is, perhaps, the most central in the city of Dublin, presenting a frontage of 41 ft., in Dame-street, opposite the Chamber of Commerce, and returning 43 ft. in Trinity-street adjoining. No expense has been spared to render this building a creditable representative of the magnificent offices erected for the company in Edinburgh, founded in 1838. The entire of each façade, five stories in height, being faced with dressed ashlar masonry from the Kenmure quarries.

The Italian style of architecture, of Palladian character, has been adopted. The ground floor, presenting a series of rusticated piers, extends to the top of *entresol* story, having moulded joints and vermiculated faces, surmounted by a frieze and cornice. The windows in upper stories are ornamented with balconies and balusters, moulded architraves, carved consoles, and alternate, straight, and segmental pediments. A deep frieze, enriched with metopes and modillions, and high balustrade, conceals the windows which light the apartments in the roof. The office entrance, situate in the centre of the principal front, is decorated with pilasters supporting projecting consoles and rusticated arch, with enriched keystone and pediment. The doors are of Riga oak, panelled, moulded, and varnished.

The ground floor affords accommodation for the business of the company, consisting of public offices, secretary's room, fireproof safe, board-room, doctor's-room, retiring-room, &c.; having a commodious set of offices for letting, on the right of central entrance, with basement story for each suite of offices, lighted by windows above the level of street paving.

The works have been executed by Messrs. Morrison, under the directions of the consulting architect, Mr. Bryce, of Edinburgh; and superintending architect, Mr. Charles Geoghegan, of Dublin. The total outlay on the premises has been about 8,000*l*. The execution of the office counters, desks, framings, and furniture, is well calculated to sustain the reputation of the manufacturer, Mr. William Brunton.

APPLICATION OF SEWAGE TO AGRICULTURAL PURPOSES.

AT the last ordinary meeting of the Middlesex magistrates, Mr. Henry Pownall in the chair,

Sir Alexander Spearman, chairman of the committee of visitors of the Hanwell Lunatic Asylum, moved, "That it having become necessary to relieve the river Brent and the canal from the sewage of the asylum, and it being desirable to utilise the sewage upon the land of the asylum under cultivation, a sum not exceeding 1,500*l*. be granted by the Court for the purpose of providing the requisite irrigating, pumping apparatus, steam engine, collecting tanks, machinery, and works for carrying into effect a plan for the utilization of the sewage of the asylum, which has been approved by the committee."

The motion having been seconded,

Mr. Mitchinson said the Court ought to proceed with great caution in this matter, for some years ago the practice of sewage irrigation at Feltham was carried on, and the consequence was that 75 per cent. of the boys then in Feltham school were found to be suffering from ophthalmia, but when they ceased the sewage irrigation ophthalmia disappeared, and there was not a single case of complaint.

Mr. Kemshead said they did not come to the Court without some experience, as they had tested it at Hanwell for six or eight months, and he was not aware of any complaints having been made at Feltham.

Mr. Thwaites thought they might irrigate the land by moderate dressings of sewage with perfect safety, and he believed with profit, and at the same time it would save the neighbourhood from a great deal of mischief which would arise from the pollution of the streams into which the sewage was turned. This was a rapidly-growing evil, and he had no doubt that, in the next session, Parliament would be called upon, by stringent legislation, to prevent that which might undoubtedly become a great evil; for if a panic should arise they might have sudden legislation, which was always unhealthy, and therefore he thought that the committee had taken the right course, and he should give the motion his hearty support.

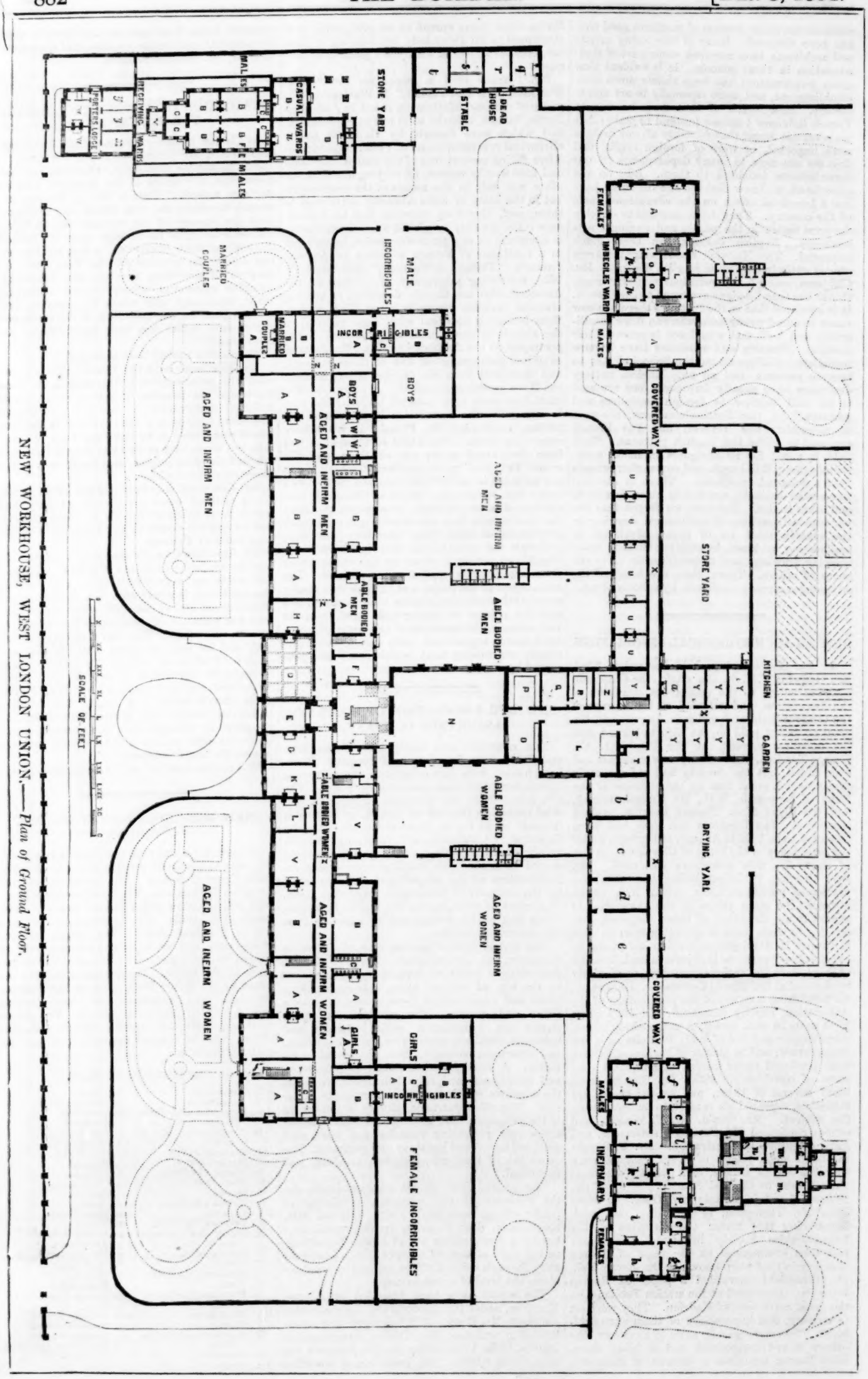
The motion was put and unanimously agreed to.

NEW WORKHOUSE, WEST LONDON UNION.

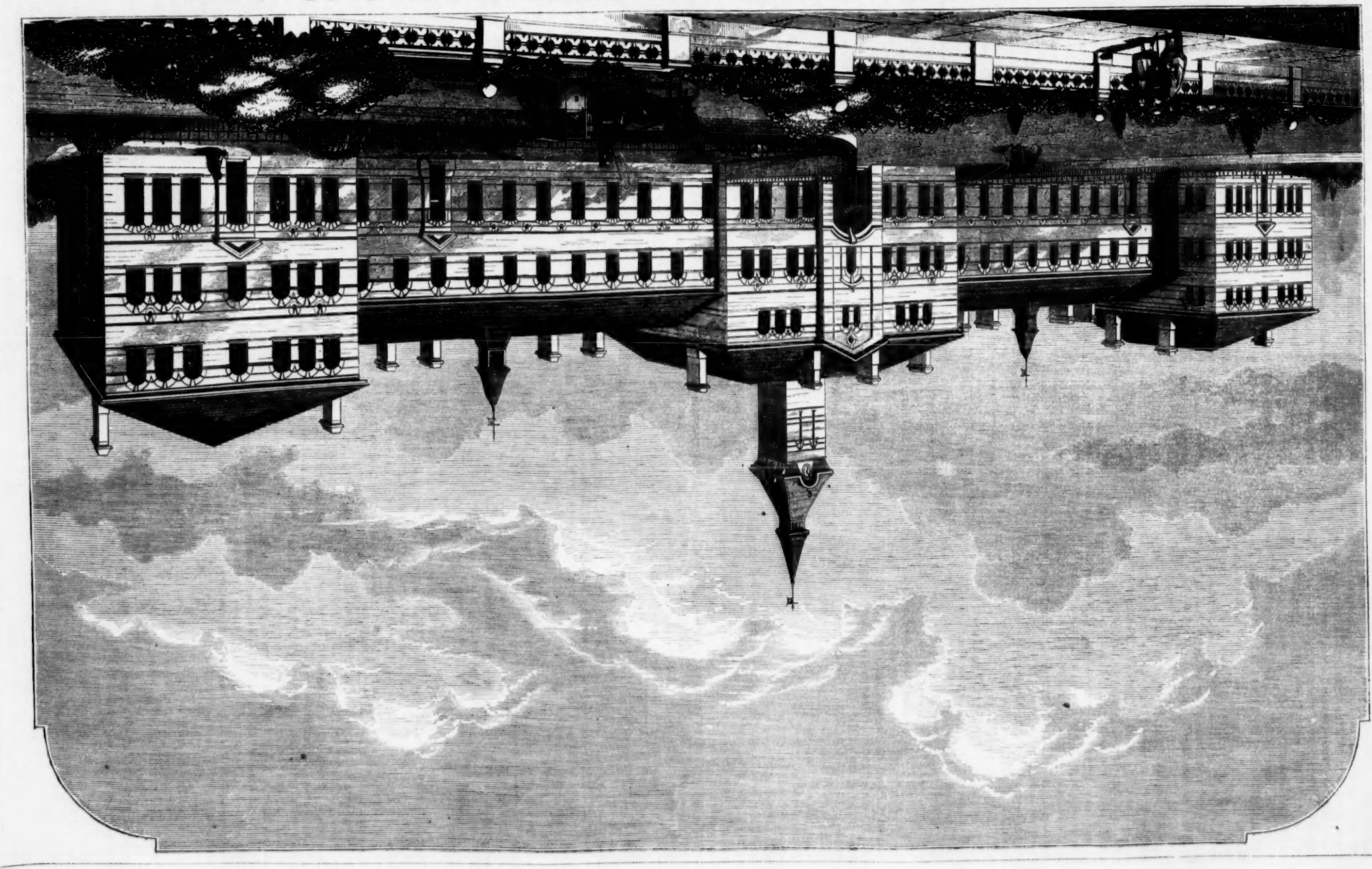
WE give a ground-plan and view of this building, now in course of erection in the Cornwallis-road, Upper Holloway. The house is designed for about 500 inmates. The buildings are of brick, with bright yellow malm facings and red brick bands at intervals. The dressings to the doors are in Portland stone. The dining-hall and chapel over, and the principal staircase, will be heated by hot water, and cold water will be laid on to all the baths. The contract (23,492*l*.) was taken by Mr. Henry Hart, of Great Dover-street, Borough. The architects are Messrs. Searle, Son, & Yelf, of Bloomsbury-place. The board-room and offices, the relieving officer's and other offices, will be erected somewhere within the limits of the union.

REFERENCES TO PLAN.

A A. Day-rooms.
B B. Dormitories.
C C. Lavatories and Bath-rooms.
D. Committee or Board-rooms.
E. Entrance-hall.
F. Master's Office.
G. Master's Parlours.
H. Master's Stores.
I. Matron.
K. Matron's Parlour.
L L. Kitchens.
M. Principal Staircase.
N. Dining Hall (Chapel over).
O. Serving-room.
P. Larder.
Q. Bread-cutting Room.
R. Bread.
S. Bread-making Room.
T. Boiler.
U U. Workshops.
V V. Workrooms.
W. Superintendent of Labour.
X X. Corridors.
Y Y. Stores.
Z. China.
a. Storekeeper.
b b. Sculleries.
c. Laundry.
d. Drying-room.
e e. Washhouses.
f f. Sick Wards.
g. Surgical.
h. Lying-in.
i i. Convalescent.
k. Surgery.
l. Coals.
m m. Fever Wards.
n. Nurse.
o o. Padded Rooms.
p p. Attendants.
q. Post-mortem Room.
r. Dead-house.
s. Stables.
t. Coach-house.
u. Oakum-room.
v. Oven.
w w. Porter's Rooms.
x. Porter's Offices.
y y. Clothes Stores.
z. Iron gates separating classes.



NEW WORKHOUSE, WEST LONDON UNION.—*Plan of Ground Floor.*



INTENDED NEW WORKHOUSE, WEST LONDON UNION; IN UPPER HOLLOWAY.—Messrs. Searle, Son, & Yeld, Architects.

ST. SAVIOUR'S CHURCH, BACUP, LANCASHIRE.

THE town of Bacup is situate about 20 miles north of Manchester, at the head of the valley of Rossendale. From a small village it has increased of late years to a considerable cotton manufacturing town of 14,000 inhabitants. The old church, built about a century ago, has long been too small for the population, as with galleries it only seats about 600 persons; and, being in a very insecure state, it has been found necessary to close the galleries and shore up the south wall until funds can be raised for rebuilding. A few years since a small church was built at the east or upper part of the town, or rather out of the town; but the inhabitants of the lower and newer portion have been for a long time without proper church accommodation. To remedy this evil a new district has been formed, and a church, parsonage, and schools have been built at the entire expense of Mr. James Maden Holt, J. P., and upon his estate; the architect employed being Mr. E. Wyndham Tarn, of Guildford-street, London. The schools were first erected, and have been licensed for divine service until the completion of the church; but the congregation having outgrown the dimensions of the school, which seats about 600, the erection of the church has been hastened forward, and its consecration by the Bishop of Manchester will shortly take place.

The total internal length of the church is 120 ft.; width of nave and aisles, 53 ft. Seats are provided for 750 adults on the ground-floor, and for nearly 300 children in a west gallery.

The nave arches are seven in number, and supported on polished red Aberdeen granite shafts, 14 in. diameter. The chancel is terminated by an octagonal apse, and has a roof formed of curved timber ribs, springing from corbels, and boarded over. Four white marble panels, 11 ft. high, are let into arched recesses between the windows of the apse, and on them is engraved the decalogue, creed, and Lord's Prayer.

The nave is covered with a polygonal ceiling of timber, with semicircular main ribs springing from corbels between the arches, and formed of three thicknesses of 3-in. planks on the De l'Orme principle, the centre thickness being cusped. The polygon, which is divided into panels by moulded purlins and intermediate ribs, is boarded throughout, the centre compartment being pierced for ventilation with tracery, filled in with perforated zinc, coloured blue, which opens into an air-chamber formed in the upper part of the roof, having louvre ventilators to open and shut at each end.

The aisle roof is of open timber, boarded on the upper side. All the roofs are boarded, and felted under the slates. A small transept is built on the south side, to form a private chapel, having an arcade on each side, with serpentine columns and alabaster panels, on which inscriptions are engraved in memory of several members of the donor's family, who are interred in a vault adjoining the church.

The tower, which is placed at the north-east corner, is 20 ft. square at the base, and the height to the top of the cross is 150 ft. The lower portion forms an organ-chamber, having arches opening into the chancel and north aisle. A peal of bells will be placed in the upper story, and a clock will be placed in a gabled dormer on the north side, at the base of the spire, one of the spire-lights being omitted on that side for this purpose. The basement of the tower is occupied by the warming apparatus, the hot-air system of Messrs. Haden, of Trowbridge, being used.

One peculiarity of the church is the baptistery, provided for the immersion of adults (when required), which is sunk in the middle of the chancel, with a descent of five steps; the whole being covered by ornamental gratings, laid level with the floor. This position is selected as being near the vestry.

The pulpit is of pitch pine, on a stone base, supported by four columns of verd-antique. The desk, fittings of chancel, and lobbies to the entrance-doors are also of pitch pine, the whole having been made by Messrs. Cox & Son, of Southampton-street. The benches of the church are open, and of stained yellow deal.

The lighting is by two gas coronas in the nave, and one in the chancel, with brackets in the west gallery and to the pulpit and desk, the whole supplied by Messrs. Hart & Son, of Wych-street. The aisles are lighted by means of Hammond's ventilating gas-lights, made from the architect's designs, by which vitiated air is removed from the church.

The passages are laid with kamptulicon, upon a concrete foundation, floated with Portland cement and surrounded by an edging of 6-in. red and black tiles. The chancel is paved with Maw's encaustic tiles.

Three years have passed since the foundation of the church was commenced, some delay having been occasioned by the necessity which arose of opening a fresh quarry on Mr. Holt's estate, from which the greater part of the stone has been obtained.

The mason's work has been done without any contractor, and under the superintendence of Mr. Robt. Mulley, the clerk of the works, the "banker masons" having been paid by the piece, and the wallers and setters by the day. The locality being peculiarly subject to driving rains, blue lias lime was used for the mortar, which was mixed in a mill. The carpenters' work has been done by Messrs. Barlow & Pott, of Bacup; the plumbing by Mr. Bulcock, of Bacup; and the slating by Messrs. Goodwin, of Huddersfield. Messrs. Edmundson, of Manchester, supplied the glazing; and Mr. Field, of Parliament-street, the marble.

CHURCH-BUILDING NEWS.

Hornsey-road, London.—The foundation-stone of St. Barnabas's Church, Hornsey-road, has been laid. The site is in the Harvest-road, Hornsey-road. The edifice, when completed, will be in the Gothic style, Early Decorated, and the dimensions 62 ft. by 94 ft., with sittings for 1,270 persons, 690 of which will be free. A tower and spire will also be erected, of the height of nearly 100 ft., and the whole, from the design of Mr. Green, architect, has been given for erection to Messrs. Carter & Sons, builders.

Cheam.—The new parish church at Cheam has been consecrated. The edifice has been erected on a site in the churchyard, parallel with the site of the old church, but exceeding that in its dimensions. The nave and tower were commenced in the early part of last year, and the whole has now been completed by the addition of the remaining portions, with the single exception of the tower, which is at present carried up to the height of the ringing-chamber only, but which is destined ultimately to support a spire. The building is in the style of the later First-pointed Gothic, and is faced externally with Kentish ragstone and Bath stone dressings, and internally with red bricks, relieved by bands of black, and having Bath stone stringcourses, voussoirs, &c., and columns of blue Pennant stone, with carved capitals. The plan consists of a nave with five bays, 65 ft. long, with lean-to aisles; a tower at the north-west angle; an apsidal chancel with an organ-chamber, and a vestry on the north side; and on the south a chancel aisle appropriated to the national school children. Provision has also been made, by a *quasi* north transept, for the accommodation of the pupils belonging to Cheam school. Altogether the total number of sittings amount to a little over 600. Stained glass, presented by Mr. J. Hibbert Tate, and executed by Messrs. Clayton & Bell, has been already placed in the four western lancets of the nave, and it is hoped that the large rose-window above, and the chancel lights, may also very shortly be similarly embellished. The subjects of the stained glass already fixed are taken from the life of St. Dunstan, to whom the church is dedicated, commencing with his education by the monks at Glastonbury, and terminating with his burial in Canterbury Cathedral. The church has been erected from the design and under the supervision of Mr. F. H. Pownall, architect, London; and the contractors are Messrs. Sharpington & Cole, of Lambeth; Messrs. Edwards & Son, of London, having furnished the warming apparatus. The total cost of the building will amount to about 4,500*l.* Of this, only 250*l.* now remain to be subscribed. It is intended to retain and fit up as a receptacle for the monuments existing in the old church a portion of the old chancel known as the Lumley Chapel, which will thus be left standing as a detached building in the churchyard.

Abbot's Langley (*Herts*).—St. Paul's church, Langley Bury, has been consecrated. It has been built entirely at the expense of Mr. Jones Loyd, of Langley Bury. It is situate in the hamlet of Hunton Bridge, about two miles distant from the parish church. The new church is in the Decorated style. Mr. Woodyer, of Graffham, near Guildford, was the architect; and Messrs. George Myers & Sons, of Lambeth, were the builders. The church consists of a nave, north aisle, chancel, with vestry, organ chamber, and south-west porch; and a private mortuary chapel on the south-east side, for the Loyd family. The church is built of squared flints and Bath stone. The tower with spire is 130 ft. high. The latter is made of wood covered with oak shingles. The length of the church is 108 ft.; the nave is 18 ft. wide, and the chancel 16 ft. 6 in. There are sittings for 200 adults and sixty children, exclusive of those in the chancel: 100 sittings are free. The seats are of wainscot oak, and of modern style. The roofs are of stained timber, open to the ridge, with white plaster between the rafters. The interior pillars are composed of clustered columns, of Forest of Dean stone, with moulded bases and carved capitals. The carving both within and without the church was done by Messrs. Myers. The arcades are carved with figures of angels in postures of prayer and of praise. The chancel arch is carved. It is supported on Forest of Dean shafts. The chancel is paved with Minton's encaustic tiles, and the nave with those of the Pottery company, of Poole, Dorset. The tower contains a peal of six bells, cast by Messrs. Mears, of London, the chief tenor of which weighs 8 cwt., given by the congregation, and a foreign bell given by Lord and Lady Rokeby. The church is heated by hot-water pipes, supplied by Minton & Son. Mr. Beckensall was the clerk of the works, and Mr. Shillitoe, the foreman.

Tenbury (*Worcestershire*).—Woolferlow Church near Tenbury, which has been undergoing restoration for some time past, has been re-opened. The church is an Early English structure (with relics of Norman work), dedicated to St. Andrew. From age the building has become much dilapidated. It is now restored from the designs of Mr. Cranston. A great portion of the walls has been rebuilt. The framework of the roof is new, of red deal, after the pattern of the original. The bell-turret remains, surmounted by a spire of cleft oak shingles. The tracery of the windows and the new font are of Bath stone. The floor has been laid with black and red quarries, and open seats are substituted for the high-backed square pews. A vestry and stone porch have also been added. The edifice now affords sittings for upwards of 100 persons.

Paignton (*South Devon*). — The recently restored chancel of the parish church has received a permanent decoration, the work of an amateur artist, Mr. Vernon Benbow. The east wall, from the ground to a sufficient height above the altar has been painted in a diaper of green, with vermilion and black, and illuminated with gold crosses. This is finished above each end of the wall with a cresting of gold, surmounting the word "Alleluia." Immediately over the altar the words "I am the Bread of Life" are painted, the initial letters being adorned with representations of the vine, corn, and holly. A border of Passion-flowers runs round the text, and in either corner is an appropriate design. Other decorations, also, have been effected.

Llangollen.—Messrs. Roberts & Co., builders, have commenced to alter and enlarge the parish church, having contracted for the work. The plans have been made by Mr. S. P. Smith, architect, Shrewsbury. The church when enlarged will contain sittings for about 1,000 persons. The carved oak roof will be preserved, and it is said to be probable that no antique feature of the edifice will be demolished. About 2,000*l.* have been already contributed towards the work.

Aberdare. — With reference to St. Mary's Church, described on the 19th of November, we are authorised to state that the seats are stained and varnished; that the carving, which is not profuse, was executed by Mr. Whittingham; and that the contract was taken at 2,797*l.*; and in the building itself (which seats 700 adults), the extras, if any, can only be of trifling amount. This is exclusive of boundary walls and gates.

Liverpool. — St. Philip's Church, Hardman-street, has been formally re-opened. The improvements in the church include the reseating of both body and gallery with open benches, the repainting and colouring of the interior, the addition of several stops to the organ by Gray & Davidson, and several minor alterations. Two painted memorial windows have been made at the west end of the church, the windows being presented by the Rev. C. H. Burton, in memory of his children. Mr. Burton has also fitted up the baptistery at his own expense. The architect has been Mr. Grayson; the builders, Nicholson

& Eyre; the painters and decorators, Gardner & Son, of Duke-street; and the memorial windows have been designed by Mr. Forrest.

Slawston (*Leicestershire*).—The church of All Saints, Slawston, was, until recently, one of the most defaced and dilapidated churches in the county; but it has undergone a restoration, and has been re-opened for divine service. Before restoration the tower arch was also blocked up, and there was a gallery which projected as far as the south door, and which had a very unsightly and heavy appearance. This gallery has been removed and the tower arch opened. There was formerly a low dilapidated brick porch at the south door: this has been removed, and a bold arch erected, with a high-pitched roof. The chancel is entirely new or rebuilt, except the gable end. There is a new east window of Decorated design. The clerestory has been rebuilt, and a new south porch made. The new chancel is of the Early Decorated period, in keeping with the church. The fittings of the church consist of open seats, new roof, new reading-desk, lectern, and pulpit, all of deal. By the restoration, above thirty additional sittings are gained. Messrs. Goddard & Son, of Leicester, were the architects, and Messrs. Loveday, of Kibworth, and Mr. J. Stanyon, of Market Harborough, the contractors; the former doing the wood-work, the latter the stone.

Bromborough (*Cheshire*).—A new parish church for Bromborough, the foundation-stone of which was laid about two years ago, has been consecrated by the Bishop of Chester, and formally opened for divine service. The new building has been erected on a site adjoining the old parish church. Mr. C. K. Mannering, lord of the manor, gave an acre of land adjoining the old churchyard, a donation of upwards of 2,000*l.*, and agreed to provide red stone from a neighbouring quarry sufficient to build the church. The new church has been erected by Messrs. Holme & Nicol, of Liverpool, from the designs of Mr. Gilbert Scott, of London. The style is Early Gothic. The roof is of open timber, with the exception of the apse, which is close timbered, ribbed, and decorated. Some portions of the building are embellished by carving and decorations, and over the communion table is a memorial window. The interior comprises a nave, two aisles, chancel, vestry, and chapel. It is calculated to seat 600 persons. The cost of the building will be about 5,000*l.* It is intended to add a tower and spire.

Campfield (*Manchester*). — St. Matthew's Church, Campfield, has just been repaired and painted. In addition to the various improvements and decorations, there are two large painted glass windows, in the sides of the chancel. These windows were exhibited in the Kensington Museum, London, last summer. The windows are each composed of three lights or openings, and tracery. The central divisions of each window are filled with subjects illustrating incidents in the life of our Saviour; in one compartment, "Blessing little Children," in the other, the "Charge to Peter." The side openings, four in number, contain representations of the Evangelists, Matthew, Mark, Luke, and John, life size. The tracery is filled with ornamental forms, containing sacred emblems and monograms—Agnus Dei, cup and vine, pelican, and emblems of the Trinity, with I.H.S., and "Alpha" and "Omega." The work was designed and executed by Messrs. Edmundson & Son, of Manchester, who also designed and executed a short time ago the central memorial window. It is composed of three lights, and contains representations of the "Ascension" (in the middle opening), the "Last Supper" and "Baptism," in the side divisions. The tracery is filled with a figure of our Lord in his sovereignty, and angels bearing scrolls with Scriptural texts. The organ has undergone a restoration, and several new stops have been added to the great and choir organ.

Roughton (*Norfolk*).—The parish church of St. Mary, Roughton, having in the course of the year undergone restoration, has been re-opened for Divine service. The roofs of the nave and aisles have been entirely renewed, partly in oak, and partly in fir, the original designs having been adhered to. The walls have been plastered throughout in a warm tint. The floors have been laid in red and blue 4-in. Staffordshire tiles, except within the communion-rails, where the floor is of Minton's encaustic tiles. The chancel arch has been rebuilt, and the stonework of the windows, arches, pillars, &c., cleaned and repaired. The aisle and clerestory windows have been glazed in a pale olive green, with a white border; and the tracery of the east window has been filled with stained glass by Hardman, of Birmingham, the lights being for the present fitted with quarries of tinted cathedral glass. The screen and all the chancel fittings are of oak, carved in light open tracery, in keeping with that of the windows. The pulpit is also of oak, carved, with a stone vase. The old high pews have been replaced by low open benches, with carved ends, which will afford seats for 216 persons, the accommodation being thus considerably increased. The whole of the work was committed to Mr. R. Cornish, builder, North Walsham.

Lakenham.—The new chancel of Lakenham church has been consecrated. The new chancel is twice the length of the old one, affording about seventy additional sittings. It is oblong in form, with an apsidal end, and is built of flint with stone dressings, finished with a traceried parapet. It contains in all nine windows—three at the end and the others on either side. They are in the Perpendicular style. One of the three end windows is already filled with stained glass, and the remainder, it is expected, will be similarly furnished by next Easter. Internally, it is finished with coloured stucco, with stone dressings and coloured arch stones. The light open timbered roof does not, strictly speaking, harmonise with the roof of the church itself. The cost, when the whole has been completed, will be about 1,000*l.*, including gifts. Mr. J. Brown, of Norwich, is the architect; and Mr. Worman, the builder.

Weybread (*Suffolk*).—The parishioners have decided upon restoring their church, at a cost of about 1,000*l.* Plans have been prepared by Mr. R. M. Phipson, architect; the contract has been taken by Mr. Grimwood, of Weybread; and the works will be commenced forthwith. The restoration consists of putting an entirely new roof to the nave, of the same design as the old one, which has become very rotten; repairing the two aisle roofs; benching the church throughout; building a new vestry and organ chamber; restoring the chancel; putting in new east window; laying the floors with Minton's encaustic tiles; and other repairs.

SCHOOL-BUILDING NEWS.

Bloxham.—The new buildings added to All Saints' Middle School, Bloxham, have been opened. The building is situate on high ground, at the north end of Bloxham. The school was opened in January, 1860, with *one* boy: it now numbers over fifty boarders, besides day-boys, and it was to provide for the increasing numbers that it was found necessary to add the new buildings. A close of 5½ acres immediately adjoining the premises has also been recently added to the playground, and the school now stands on grounds of its own of more than 10 acres in extent. The new buildings have been executed by Mr. Thomas Barrett, of Bloxham, builder, from designs by Mr. G. E. Street, the diocesan architect.

Newport (*Monmouth*).—The building for the Ragged School has been opened. It is situate in Dock-street, at its junction with Mellon-street. It is a building of two stories, the design in the Gothic style; but owing to the restricted means at the disposal of the committee is necessarily plain in character. It consists of two school-rooms, capable of accommodating about 100 children each: the lowest room is for boys, and the upper room for girls. Each school-room measures 40 ft. by 21 ft. 6 in.; the boys' 12 ft. high, and the girls' room, being partially in the roof, is 15 ft. high. The buildings are of ballast-stone, faced towards Dock-street and Mellon-street with Bodmer's patent bricks. Freestone is sparingly used for dressings, and red bricks are introduced in the arches. The roof is covered with slates. The building has been erected by Mr. L. B. Moore, under the superintendence of the architect, Mr. Samuel Hancorn, of Newport, whose design was chosen in a competition among local architects.

Fladbury (*Worcestershire*).—The first stone of a new National School and master's house has been laid here. The school-room, designed to accommodate 120 children, will be 51 ft. in length by 19 ft. in width; the walls of red and black brick, with bands and dressings of stone. The style is Early Decorated. The architect is Mr. Preedy, of London; builder, Mr. J. Griffiths, Eldersfield.

Manchester. — The foundation-stone of St. Catherine's Schools, Newtown, has been laid. The architects are Messrs. Speakman & Charlesworth, of Manchester. The contract was taken by Messrs. Statham & Son, Pendleton, builders; and the estimated cost, according to the plans which have been approved by the Committee of Council on Education, inclusive of the school fittings and the extra cost of the excavations that will be entailed by the nature of the soil, is 1,900*l.* The building will be of Gothic design, of common red brick, interlaced with bands of blue bricks to give relief; and will accommodate about 800 children. The boys' and infant schools will be on the basement floor; the former being 42 ft. by 30 ft., and the latter 51 ft. 6 in. by 20 ft. There will be separate entrances to these, and also to the girls' schools, which are to be situate on the floor above. To each school will be attached class-rooms; and on each floor there will be lavatories and other conveniences. The girls' schools are to be divided by a moveable partition, which can be easily shifted, and the two converted into one large room, to be used for tea meetings and other public purposes. On the basement floor the requisite appliances for cooking will be supplied.

North Shields.—The additional Roman Catholic schools, in Nelson-street, North Shields, have been opened. The first school was built by the late Rev. Thomas Gillow, twenty-four years ago. It was capable of holding 200 children; but it has long been too small, and on the 26th of July last, the foundation of an additional building was laid. The new building is on the south side of the old one, and fronts into Cecil-street, having a good piece of playground in front. The architect was Mr. Thomas Gibson, North Shields; and Messrs. Honeyman & Son were the builders.

STAINED GLASS.

Gorton Church (*near Manchester*).—A stained-glass window has been erected in this church by Mrs. Grimshaw, of Woodland Bank, Stockport, to the memory of her late husband, Mr. Geo. Grimshaw. It is in one opening filled with rich borders and canopy work. The subject is the Raising of Lazarus, with the text, "Lazarus, come forth." An inscription running across the base of the window shows the object of its erection. The window was the work of Messrs. R. B. Edmundson & Son, of Manchester.

St. Thomas's Church, Oxford.—A window has just been erected in this church, to the memory of the late Mrs. Skene, of Frewen Hall. The window contains on the right light a figure of our Lord, as represented in Rev. ii. 12, standing between the seven candlesticks, and bearing the seven stars in His right hand; His feet resting upon an altar. This is intended to symbolize the Church Militant. In the other light, which represents the Church Triumphant, is the figure of a "Bride adorned for her husband" (Rev. xxi. 2), attended by angels, and bearing in her hands a picture of the new Jerusalem. The artists were Messrs. Clayton & Bell. The subject, we believe, was chosen to harmonise with the east window of the aisle to which it comes next, and it is hoped that eventually all the windows in this part of the church may be filled with a series of apocalyptic subjects.

Staindrop Church.—The new memorial window to Henry second Duke of Cleveland, in the old church at Staindrop, is now finished. The stonework was executed by Mr. D. Hurworth. The window contains five lights, with tracery, under an elliptic arch, and is adorned with copies of the subjects which were in the same window in the year 1344. These have been discovered, through the exertions of the Rev. James Hodgson. The figure of the Saviour forms the centre light, and in the right are full-length representations of St. Ambrose and St. Jerome. The other two lights contain figures of St. Augustine and St. Gregory. On the upper part of the window are seven shields, bearing arms, and representing the shield of the Duke of Cleveland, Neville De Ros, and Dacre. The glass was supplied by Messrs. Clayton & Bell.

York Town Church, Blackwater. — The east window of this church has this week been filled with stained glass. In the centre light is introduced the subject of the "Ascension;" in the dexter light, "Raising of Jairus's Daughter;" and in the sinister light, "Suffer little Children," &c. This window has been placed in the church by Captain E. A. Anderson, of the 18th (Royal Irish) regiment, in memory of his wife, who died 15th April, 1864, an inscription to this effect being inserted on the stone sill immediately under the window. The artists were Messrs. Heaton, Butler, & Bayne, of London.

WORKING MEN'S EXHIBITIONS.

EXHIBITIONS of the hand-work of the industrious classes appear likely, for some time to come, to prevail, both in the metropolis and in many of the provincial towns; it is, therefore, a matter of great importance to consider if the arrangements of these exhibitions are such as are best calculated to improve materially our art manufactures. Take, for instance, the recent collection in the Agricultural Hall, Islington, and let us—while admiring the motives which caused it to be brought together and praising much that it contained—glance at the effect which this exhibition was likely to produce on the exhibitors and visitors.

In many departments there were remarkable displays of ingenuity and patience, and most of these were effected in a line of work to which the authors had not been regularly educated; moreover it was to be noticed that there were not many works of invention shown which will be of eminent usefulness: this may have been in part caused by fear on the part of inventors that their plans might be taken up without proper care for the discoverers, and in some cases there would be a want of inclination or means to defray the charges of the Patent Office. For the full success of such expositions as this, and even in connexion with the greater gatherings of the world's industry, changes in the law of patents and the registration of designs are needed. It proceeded, however, more especially from the fact that people are rather prone to dabble in attempts to show their skill in other ways, than to strive for perfection in their own especial branch.

In certain instances a versatility of talent has advantages, and leads at times to important results. It may be shown how ship-carpenters, joiners, sailors, and blacksmiths, have become skilled painters, and some who have "whistled at the plough," famous men of science, poets, and philosophers. These instances are encouraging, but it should be remembered that they are but few in number, even in the course of a century. Gladly should we hear that the Islington exhibition had been the means of directing the attention of some to a more brilliant and valued kind of labour than that on which they had been previously engaged; but it seems to the writer that a chief aim of such meetings as this has been too much overlooked. Many would have liked to see architectural carvers in stone and wood striving, in their leisure hours, to produce the very best work they could, in both design and execution, and not branching into other directions, and showing at the best but indifferent attempts; and it would have been more useful if the makers of musical instruments had devoted the strength of their ability to productions of that kind instead of to carvings in wood and stone. It is not our wish, in the few remarks here made, to throw damp on such gatherings which, besides many other advantages, are the means of bringing various classes together; but with an earnest wish to get the ingenious into a right working channel, we throw out this hint—to the young men especially who are engaged in artistic and skilled manufactures,—and urge them to produce good work in their particular crafts. A year or more will elapse before there will be another exhibition of this kind in North London. There are the long nights of winter coming, when they might be thinking over their intentions. Let those who are engaged in branches where design is needed, avail themselves of the artistic books in the Mechanics' Institutions, or in the schools for art instruction, in various parts of the metropolis available, or in the Kensington Museum, and then let them see what they can do in their own way. If this course be followed, we predict an exhibition on another occasion of quite as much general interest as the last, and of far more utility.

It should be one of the chief advantages afforded by such exhibitions, that those who are beginning life in various paths should be able to show examples of their ingenuity and work, and that employers of labour should go there with a practical intention.

On Wednesday evening last a meeting was held at Allen's Riding-school, Bryanston-square, for the purpose of affording information and obtaining support for a proposed scheme of a working men's industrial exhibition for Marylebone. The Right Hon. W. Cowper occupied the chair, and opened the business of the evening. The meeting was also addressed by the Rev. Eardley Wilmot, who represented the central committee for carrying out the exhibition, and he explained the opening of the undertaking, and the means by which they proposed to carry it into effect. The following resolution was adopted:—"That this meeting cordially approves the proposed Working Men's Industrial Exhibition for the borough of Marylebone, and pledges itself to use every exertion to make it a success." A district committee was subsequently appointed, and arrangements were made for providing a guarantee fund to meet the necessary expenses.

SANITARY STATE OF TOWNS.

As we predicted in the course of the extraordinarily dry summer, the health of the community is now suffering from a very general prevalence of fevers. Of course, where such diseases normally prevail, the evil shows itself in an increase, though not in an origination, of the fever.

Such is the state of some parts of Liverpool, that the Privy Council have sent down Dr. Buchanan, one of the physicians to the London Fever Hospital, to investigate the matter. In their letter to the local authorities, their lordships state that "they find from documents which, at their request, have been supplied by the Worshipful the Mayor of Liverpool, that epidemic fever has, for a very considerable period, been prevailing in that borough; that for two years past the fever deaths have been, in proportion to population, more than have occurred in any town in England, so far as their lordships are aware, since the famine fever of 1847; that within the last few weeks this already excessive mortality has all but doubled its weekly average; and that there is reason to fear, as winter approaches, a still further extension of the disease. Their lordships consider it of great public consequence that the causes and circumstances of so serious an epidemic should be thoroughly investigated, and that nothing should be left undone which can be done to prevent its further ravages." The inspector has been very politely received, the parish and union authorities having resolved to facilitate his inquiries in every way.

At Lincoln, it is said that fevers and small-pox prevail in all parts of the city. A correspondent of the local *Chronicle* says on this subject,—"The Local Government Act is imperatively required; and although in the present peculiar stage of the sewage question it would not be advisable to decide upon any definite system, yet we ought to be in a position to avail ourselves of its powers, and act upon them without delay, for it is life or death. Our present pretence of drainage could not be worse, and in no village of savage Africa, or town in Germany, is there such carelessness and filthy unconcern, such wanton neglect and suicidal wastefulness, as is to be found in this city."

At Canterbury scarlet fever is very prevalent. Some families have lost three or four children, and in almost every street half-closed shops are to be seen. As many as ninety cases of fever are reported to have occurred in one parish within a short period, and the epidemic appears to be rather on the increase than otherwise.

SANITARY STATE OF MARYLEBONE.

THE monthly report of the health and climate of St. Marylebone, during July, August, September, and October, 1864, by Mr. John Whitmore, M.D., the new medical officer of health for the district, has been printed by order of the vestry. From this report it appears that the total deaths in the parish from all causes during July, August, September, and October, amounted respectively to 330, 288, 295, 319, which were less in the aggregate by 19 than those of the corresponding months of the year 1863. The deaths from diarrhœa for the same period amounted to 126, of which no less than 112 were amongst infants and children, under the age of five years, whilst the returns from eleven charitable institutions in the parish give the large number of 4,335 cases under treatment for the same complaint. Diseases of the zymotic class generally have ranged high during the past four months: 316 persons have died from them, of whom small-pox destroyed 5, measles 30, scarlatina 43, and typhus and typhoid fever 33. "In former years," remarks the reporter, "the mortality and sickness in London and other large cities and towns, were highest in the summer months, arising principally from the prevalence of fevers and other diseases of this class; but the legislative enactments of late years, in regard to sanitary measures, have effected a great change, and we now find that the highest mortality prevails in winter. Still, the ravages from what may be termed preventible diseases in this parish are so obvious, as shown in the figures here quoted, that, beyond the facts before us, little else is needed to stimulate all who are engaged,—officially or otherwise,—to persevere in the work of social and sanitary improvement."

THE MOSQUE AT HEBRON.

To get rid of a standing argument against some of his expressed opinions, Mr. James Fergusson has been to Syria; and, asone result, has given in the *Times* an account of his visit under fortunate circumstances to the long-hidden sanctuary at Hebron. We repeat his description of the mosque:—

"The first glance of the court-yard on entering is certainly disappointing. It is surrounded on three sides by low buildings, wholly destitute of architectural ornament, and without even a respectable moulding. Externally they are of stone; but internally the walls and roofs are plastered and whitewashed.

In two very small chambers in these buildings are placed the cenotaphs of Abraham and Sarah. The real tombs,—if they exist,—are of course in the cave below the floor. Those which are shown are covered with curtains of silk, green and red respectively, richly embroidered with gold. They are however, very much faded, and never could have been either so rich or so beautiful in design as that which covers the tomb of Neby Daoud at Jerusalem. Like the building which covers them, and all those which surround the court, the cenotaphs were placed there by Nazivel Malik ibn Kalaoun, the Sultan of Egypt, in 732 Hegira, A.D. 1331.

Having satisfied myself regarding these, I at last crossed the threshold of the mosque, and a few seconds sufficed to reveal its history. It is a Crusaders' church, built after the 6th crusade, A.D. 1228. The clustered piers,—there are twelve shafts to each,—and the form of the vault of the roof preclude the idea of its belonging to the first kingdom of Jerusalem. If we take 1250 as a mean date, it cannot be many years from that either way. The length from the door to the altar is 70 ft.; the width across, 97 ft. It consists of a nave with a clerestory, supported by three very irregularly-spaced pointed arches; and beyond the nave, on either hand, a low aisle, the outer wall of which is identical with the old Jewish wall of the harem. The roof is a pointed vault of intersecting arches, of the form universally prevalent in Italy in the thirteenth century.

The most beautiful thing in the mosque is the pulpit. According to a Cufic inscription on it, it was originally made for a mosque at Askalon, and finished in A.H. 484, A.D. 1091,* and tradition says was brought here by Saladin. There is a similar pulpit in the Aksa at Jerusalem, nearly a century later in date, and neither so elaborate nor elegant as this, which is without exception the most beautiful specimen of wood-carving I am acquainted with. It also interested me to find that both these were in the same style as the cathedral gates made about the same time for the tomb of Mahmoud, of Ghuznee, which Lord Ellenborough brought away in triumph under the mistaken notion that they had once belonged to the temple at Somnath."

"On the north side of the court are two small apartments containing the cenotaphs of Jacob and Leah. They are of the same style as the other buildings of Ibn Kalaoun, with this difference, that there are two small domes on the range of buildings which contain them, which are the only domes in the place."

"When I had completed my notes, and my pulse had become steady after the excitement of the morning, I turned to an old cavass, who was smoking in the passage, and expressed a desire to go and visit the city. He readily agreed to accompany me, and preceded by him, and followed by my own servant and a horse-keeper, I sallied forth."

"When I reached the mosque I was allowed to examine and measure all the accessible parts, not only without obstruction, but without being annoyed by pressing curiosity. The conclusion I arrived at from this part of my survey was

* I am indebted to the extracts from Mahomedan authors, contained in a *brochure* published by Dr. Rosen, the Prussian consul at Jerusalem, for several of these dates. They are amply confirmed by the architecture.

that the outside wall is undoubtedly Herodian—of the same age, indeed, as the Wailing-place of the Jews and other portions of the substructure of Herod's Temple. Here, however, the stone is better and more uniform in texture than at Jerusalem, and consequently better preserved; but there does not seem a shadow of reason for supposing that the Jews ever erected such a building before the Romans infected them with their megalithic propensities."

Mr. Fergusson tells us that his examination of the localities at Jerusalem was tolerably exhaustive, and he has come back more confirmed than before in the correctness of all he has written or said with regard to the Holy Places. He has nothing to unsay and very little to add.

THE BUILDERS' BENEVOLENT INSTITUTION.

On Thursday, the 24th ult., a general meeting of the friends and subscribers of this charitable institution was held at the London Tavern, Bishopsgate-street, to elect three pensioners (two males and one female) on the funds of the Society. Owing to the absence of Mr. Thomas C. Lucas, the president, through indisposition, Mr. Joseph Bird was unanimously voted to the chair. Among the gentlemen present were Messrs. Plucknett, Dines, Hutcheons, Phillips, Ebbs, jun., Joseph Bird, W. Todd, G. M. Hall, R. Richardson, G. Head, J. R. Head, Hubbock, J. G. Howard, G. Hibberd, &c. &c.

The Chairman in opening the proceedings, said they had assembled for the purpose of electing three additional pensioners upon their funds, and regretted that they were unable to elect more of the candidates who then presented themselves, they already having thirty-six recipients of the benefits of the institution. He would not further detain the meeting, but at once declare the poll open.

On the return of the scrutineers, Messrs. Cozens and Stirling, after the close of the poll,

The Chairman announced the following as the successful candidates:—

George Merrion, aged 70, of Hoxton, who had suffered from losses in trade, and was greatly afflicted with gout, which rendered him unable to work for his living.

J. S. Wilson, aged 71, of Kingston-on-Thames, who was unable to earn his living through rheumatism. He had been ten years a subscriber to the Institution.

Clarissa Smith, aged 70, widow of the late George Smith, builder, of Puttenham, near Guildford, Surrey. She is blind, and had no means of support but what she received from her relations.

The Chairman, in allusion to those candidates who had on that occasion been unsuccessful, said that through the energy and kindness of their president, Thomas C. Lucas, esq., the donations at their last annual dinner had exceeded any former year, and he therefore had little doubt, but that in May next there would be another election. He found that at this election there were a great number of votes unrecorded, amounting to some thousands, and it was, therefore, necessary that a little more exertion should be used on the part of the candidates to ensure a return.

Some votes of thanks closed the proceedings.

ISLINGTON INSTITUTIONS.

The profit, about 1,110*l.*, which has arisen from the Industrial Exhibition in Islington, is a satisfactory fact, and shows that by means such as this funds may at times be raised which might be devoted to the foundation of establishments which will be of permanent advantage to the working classes. It has been suggested that a part of this sum should be applied to assisting in the erection of a school of art. In Islington, notwithstanding the general intelligence and well-doing of the inhabitants, there has been comparatively little done to promote the welfare of the poorer part of the community. There are no public baths and washhouses in this large parish: there is no public library, where, even by payment, working men may procure books. It would surely be an easy matter to establish a free library there—similar to that in Manchester—and a portion of the fund arising from the exhibition might be usefully put towards the building of a place for this purpose, which might be erected by voluntary subscriptions, and then, if this were done, a rate of about a halfpenny in the pound per annum on the rental would serve to keep up and extend the library. It is worth consideration if it be not possible to have in a building, in some central situation, accommodation for a free library, a school of art, and a hall for popular lectures The advantage of such an arrangement would be great; but, unfortunately, in the metropolitan parishes, there is a want of that spirit of emulation respecting public institutions which exists between towns. If we could but get that concentrated attention to these matters, in Islington, St. Pancras, Marylebone, and so on, which is paid by business men in Manchester, most satisfactory results would be the consequence.

THE CAB FARE ACROSS HYDE PARK.

Some cabmen, it seems, still choose to assert their right, when they take a fare through Hyde Park, going, say from Chelsea to Hyde Park Gardens, to charge as if they had travelled round by Park-lane. They should be warned in time that they have not this right. We have before us a correspondence between Mr. S. Lahee and Lieut.-col. Paschal, on the part of Sir R. Mayne, ranging from May 20, 1863, to the 20th of October, 1864, during the whole of which long time Sir Richard was promising that measurements should be taken, and the tables of fares revised to meet this difficulty. On that last date Col. Paschal informs his correspondent, that "a table of distances and fares across Hyde Park to points on the north side has been fixed at the standing near Queen's-gate, Kensington, and that another is ready to be fixed at the standing near Hyde Park Gardens, giving the same information to points on the south side." Mr. Lahee naturally asks whether these will be deemed sufficient notice to *all* cab-drivers, and whether all cab-fares, shortened by the new road, whether from these stations or not, will be affected by them; and he can get only the unsatisfactory reply that the magistrates must decide when any case is brought before them! Surely we ought to have the matter put at once on a better footing than this.

SUBMARINE AND OTHER FOUNDATIONS

An arrangement proposed by Captain Heathorn, R.A., has for its object improvements in the construction of foundations in deep water, under the circumstances of a level, shelving, or sloping bottom of a varying density, possibly covered with mud, or shingle.

His method of constructing the foundations for such structures upon a level bottom is as follows:—A caisson of annular construction, but so shaped as to give the space it encloses a conical form, is made of sheet-iron: the bottom portion is floated out to sea exactly over the spot upon which the building is to be erected, and there anchored: concrete is then placed in the caisson, so as to cause it to sink equally; and as soon as it is sufficiently deep in the water, an additional height of the caisson is fixed, and more concrete placed therein to sink it deeper. This operation continues until a firm foundation is obtained by the weight of the caisson, with its interior filling of concrete causing it to sink through the mud or other soft ground to the hard ground beneath. The interior is then filled up with stone or concrete, upon which, and the concrete in the caisson, the superstructure is erected. For shelving or sloping bottoms the caisson will bear only upon the highest side of the same, and to preserve the perpendicular of the caisson, immediately it touches the hard ground stones are placed in the interior of the caisson, which will naturally settle themselves in such position as to form a wall underneath that portion of the caisson which does not touch the hard ground, thereby forming a foundation upon which the caisson may rest.

"MEND YOUR WAYS."

A correspondent writes,—"Nothing can be more desirable than your suggestions on this subject in your last number; but will you kindly consider the situation of hundreds of occupants of houses of moderate and small size in many of our streets, in which there is *no male resident*, or, if there be any, their duties as clerks in offices and shops quite prevent them from handling the broom and shovel daily. Surely it would be far better that the duty should be performed by the *parishes*, and a *small* rate levied for the purpose."

Of course, we do not contemplate occupants handling the broom themselves. There are plenty of unemployed boys to be found.

METROPOLITAN BOARD OF WORKS.

THE CHARGES AGAINST THE BOARD.

At the last weekly meeting of the Board, Mr. Freeman called attention to the evidence respecting the Board given before Lord R. Montagu's committee, and to the statements made in public vestries relating thereto. He complained that charges had been made against the Board, not only of want of wisdom and discretion, but actually of conduct that was not honourable. These charges were made before a committee of the House of Commons, certified by two members of the Board, taken up by some men of mark in various vestries, and thrown broadcast over the whole length and breadth of the metropolis. That showed the necessity for inquiry by the Board, for the purpose of giving to the public the most calm and dispassionate answer they could furnish. If they remained longer silent they would be unjust to themselves, to those who sent them there, and to the principle of local self-government, which they were supposed to represent. He denied that the Board had acted unjustly, or that they had squandered the public money. He thought the time had come when a committee should inquire into the matter, and send forth to the public an answer that would show whether they had done injustice. He moved, "That the evidence and reported statements before Lord Robert Montagu's committee be referred to the Main Drainage Committee for consideration and report."

Some discussion arose on this motion, and the previous question was moved; but the amendment was negatived by a majority of 22 to 10, and the motion was carried by a majority of the same number.

There was no escape from this inquiry, as we said not long ago.

PLYMOUTH.

A correspondent informs us that, among other local improvements, a terrace of seven first-class houses is being erected on a field adjoining the Esplanade, and fronting the Hoe. A main street has been constructed through the property direct to, and with an entrance for foot-passengers on, the Hoe; thus affording a direct approach to this much-to-be-admired public promenade from the west end of the town. The land for the terrace was purchased some time since by Messrs. Call & Pethick, contractors, of Plymouth; and the houses are being built in accordance with designs supplied by Mr. W. H. Reid, architect, the surveyor to the estate. The outlay will not be less than 20,000*l.*; and as the object of all parties concerned is to supply the long-felt want of superior houses with accommodation for large establishments, it is to be hoped the views of the promoters will be fully realized. It was originally intended to restrict the terrace to private residences; but an offer having been received from the committee of the Royal Western Yacht Club, to purchase one house for the use of the club, the restriction was withdrawn. The architect for the internal arrangement of the club-house is Mr. O. C. Arthur; and, although the original elevations, prepared by Mr. Reid, have been subjected to some modification, consequent on the difference in plan, the architecture of the terrace remains unaltered.

STRIKES AND COMMERCIAL COMPANIES.

At the opening meeting of the Society of Arts, the Chairman of the Council in his address, said:—

In connexion with the progress of our manufactures and the prosperity of the working classes, the Society has also given its attention to the question of strikes, the existence of which in the aggravated form lately exhibited in Staffordshire, notwithstanding the great improvement which has taken place in the education of the people, proves that something is still wanting to afford them individually and collectively a true knowledge of their own interests. This subject will, I hope, be again brought before the Society during the coming session. It appears to me that the legislation of the last two years, with regard to commercial and manufacturing companies, opens to working men an entirely new relationship to their employers, which requires much consideration and the special attention of those who direct the education of their children. The large number of industrial establishments hitherto entirely under the control of

individuals, but which have recently been formed into joint-stock companies, with limited liability, will I hope be the means of gradually preventing the recurrence of those differences between the employers and the employed which have been prolific in causing mischievous combinations of workmen, and led them to follow the *dictum* of self-constituted committees, whose object appears to be the attainment of irresponsible authority over their fellow-workmen, rather than the real and permanent welfare of the class to which they pretend to belong. Hitherto the workmen have seen their employers accumulate vast capital, increase and extend their works, and live in almost princely style, upon profits derived in a great degree from their constant toil, and the intelligent exercise of their labour; whilst their own position, from the day they commenced life to their maturer years, has scarcely been improved. They still live in the same ill-ventilated, incommodious, ill-drained houses, in which it is almost impossible for them to maintain their families in health or decency; and perhaps, with the exception of obtaining better education for their children than they could get themselves when children, they are relatively in a worse social condition than their fathers were before them. Such facts, apparent to all, afford to the demagogue ample means and opportunity of exciting feelings of jealousy and distrust between workmen and their employers. Rightly or wrongly, they look at the one practical result, that the employers of labour year by year improve their social condition, whilst they see no prospect whatever of any similar advantage being enjoyed by themselves. Under the law of 1862, the great manufacturing and trading companies recently organized must prepare properly authenticated balance-sheets, and thereby enable the workmen to know the exact results of their labour to their employers. Should these results be highly remunerative, and large profits be realized by the union of the capital and intelligence of the master and the skilled labour of the men employed, it will, I think, be difficult for the directors of such companies to avoid considering in what manner they can distribute amongst all connected with such establishments some proportion of the profits obtained. At all events, it will afford fair ground and ample knowledge upon which the workmen can press their claims before the directors, who, if they cannot meet them by reason and sound argument, will subject themselves to an amount of disaffection among their men which must ultimately end in the workmen endeavouring to enforce their reasonable requests by declining to work for such employers.

THE SCALE OF ARCHITECTS' CHARGES.

SIR,—I was sorry to see in the opening address of the president of the Institute some incorrect statements respecting "scales of charges." Mr. Donaldson says,—

"I have observed with regret that some of the provincial societies, instead of strengthening their own position and that of the profession generally by accepting in its integrity the scale of professional charges adopted, after the most painstaking and deliberate investigation, by this Institute, have sought to publish a distinct scale of their own, founded generally upon that of the Institute, without acknowledgment, and introducing modifications of purely a local nature. This is a sad mistake. . . . . The provincial table, deprived of the sanction of the great central body, and resting only upon the authority of a limited circle of professional men, cannot have the same weight as the code of the Institute."

Now here, sir, is a remarkable series of errors, which in the interest of truth and in justice to the "provincial societies," I wish to point out in as few words as possible.

1. The only scale of charges published by "a limited circle of professional men," is the scale published by the Northern Architectural Association; and as it was published October 18, 1861, before the Institute scale (January 27, 1862), it cannot be "founded generally upon that of the Institute without acknowledgment."

2. If Mr. Donaldson means the scale drawn up by the Architectural Alliance, July, 1863, it was not published at all, but only circulated among the members of the Alliance, "with a request that they will consider the same, and return it to the secretary of the Alliance with any alterations they propose."

3. The only scale "published," "on the basis of the Institute scale," is the one published by the Alliance after their annual meeting, July last; and this is not "without acknowledgment," for it is headed "Scale," &c., "as confirmed at the special general meeting of the *Royal Institute of British Architects*, held 13th and 27th of January, 1862, and *adopted by the Architectural Alliance*, at the annual meeting, July 6, 1864, with the appended note."

The Provincial Societies, therefore, instead of undermining the influence of the scale, as Mr. Donaldson asserts, have added *immensely* to its influence, as the Alliance which comprises them does not consist of a "limited circle of professional men," but numbers 850 members, from every part of the kingdom; whereas the Institute numbers, of all classes of "Fellows," "Associates," "honorary and foreign members," "students," and "visitors," only 502.

I may here take the opportunity of correcting the impression which some of the great men in the Institute have, that the Alliance is a *rival* to the Institute: it is no such thing. All the officers of the Alliance are also Fellows of the Institute, and have, since the Alliance was established, obtained from among its members many Fellows and Associates for the Institute. The Alliance is established to *supplement* the Institute, and do work which, by its exclusive constitution, the Institute cannot do.

The Institute has this year admitted that its country members should have *some* share in its government, and have decided that two of its council shall be elected from among its country members. Let them extend the principle to its legitimate extent, and elect on the council members from the country in proportion to the number of country members, and allow them to vote by proxy, and I, as one of the promoters and officers of the Alliance, should be happy to see the Alliance delegates merge into the Institute council.

J. P. PRITCHETT.

TO CLEAN CROOKED FLUES.

YOUR correspondent, "An Old J.P. and D.L.," would probably find, as I have done, in old houses, great advantage in cleaning his flues by having a machine of his own, constructed with an iron wheel, to assist the same over flat "gathers," but worked from the top instead of the bottom, a heavy iron ball and rope being first let down, and the machine worked up and down by a man at the top and another at the bottom, a rope being, of course, substituted for the usual rods. Your correspondent might first try the effect of this with a branch of holly and a 14 lb. weight, the holly being a far better sweeper than the whalebone machine. Soot-doors, of course, would dispense with the need of this; but if the gathers are flat where passing through rooms, they are very unsightly; but, generally speaking, a soot-door in the roof will enable the sweep to clean any flue, only sometimes he leaves it open. The machine and rods, even if they get round a flat gather, generally bind tight on the top surface, and do little good to the bottom. Instead of sweeping the flues every "four or five weeks," I think that they must be bad indeed, or pinched somewhere, if "holly-bushing" them once a year will not keep them clean. Probably the mortar dropped from the top when building them now lies on the gathers; and the boys who may have been sent up to clean the same when the house was just finished dared not, I know, force the mortar past themselves, for fear of being wedged by it at the waist. The holly-bush will remove this.

A YOUNG ARCHITECT.

MUSIC PICTURES.

IT gives me great pleasure to see you have found space to call attention to the above subject, in which there is so much room for improvement; for if a piece of music is worth illustrating, it is surely worth illustrating well—a thing, I am sorry to say, rarely done, the generality of stuff one sees in the windows of music-vendors being in all points bad, very bad: it is lithographically bad, the drawing is bad, and the colouring in many instances worse. The best specimens appear to be those in which there is nothing but the title, in colours, perhaps, sometimes with illuminated capitals; but this kind is seldom met with. There are, perhaps, few things in which worse taste is shown than in this same music illustration. What, for instance, can be worse than this: a scene from a play or opera is depicted, and across this—diagonally, perhaps—is written, in large characters and vivid colours, the title of the piece. This kind may be nearly always seen. Surely, in this age of chromolithography, the cost of good drawing would be very little more than that of the rubbish now published; but I am afraid the publishers will not pay that little while they have critics no more severe than the generality of music purchasers are likely to be; so that if through the medium of your valuable publication a better state of things could be arrived at, it would be another case to swell the list of those in which you have been the means of bringing about a lasting improvement.

The only objection I find it possible to make to your article is, that it is not half so severe as it might have been; but you are, doubtless, wishful to exercise a Christian forbearance when called upon to point out any crying evil; so tempering justice with mercy. E. W.

NORTHERN ARCHITECTURAL ASSOCIATION.

AN ordinary meeting of this Association was held on the 22nd ult., in Newcastle-upon-Tyne, Mr. Pritchett, V.P., in the chair. The chairman briefly stated the proceedings that took place at the last meeting of the Architectural Alliance. Some time had been occupied at the meeting with fixing the scale of charges, but it was also agreed that no architect should be considered as having infringed the rules of the Association, though his charges might not be exactly the same as those that they had agreed upon. The Nottingham Association was received into the Alliance. The meeting then proceeded to the election of the office-bearers for the ensuing year as follows:—President, Mr. Dobson; vice-president, Mr. F. R. Wilson; honorary treasurer, Mr. Johnson; honorary secretary, Mr. Oliver; honorary solicitor, Mr. G. W. Hodge; committee, Messrs. Howison, Dunn, Moore, Pritchett, and Peachey. It was then resolved that the Association at present suppress its own scale of charges, and that the charges recommended by the Institute be used in the mean time. Mr. Oliver read a paper on "Ventilation," for which thanks were voted.

COMPETITIONS.

Tamworth.—The Local Board of Health, having taken the opinion of a consulting engineer upon the plans, sent in competition some months ago, for the drainage and water-supply of this town, have selected those submitted by Mr. Benest, of Norwich, and have awarded him the premium.

RATING PROPERTY.

RIGHT TO DEDUCT SEWERS RATE.

IN the case, Hall Dare *v.* The Overseers of Wennington, Essex, the question relating to the right of deducting sewers taxes from the rateable value of premises occupied by the owner, is considered of general importance in cases of rating. We, therefore, give a report of the judgment of one of the Judges, which sets forth the legal grounds of the judgment in favour of the appellant, and allowing the deduction.

Mr. Justice Shee said,—I am of the same opinion as the other members of the Court—in favour of the appeal. The appellant, who is the owner and occupier of 400 acres of land in the parish of Wennington, has been rated for them on an estimate of their value, in which no account has been taken of the annual charges to which they are subject in respect of the sewers rate; and the question is whether he is not entitled to have the estimate reduced by the amount of those charges. This brings us to the construction of the 6th and 7th William IV., cap. 96,—the Act to regulate parochial assessments,—by the first section of which it is provided that the rate shall be made upon an estimate of the net annual value (*i.e.*, the value above all charges) of the hereditament—that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of—*i.e.*, disregarding, or without taking into account—usual tenant's rates and taxes and tithe commutation rent-charge, if any, and, *i.e.*, but deducting therefrom—that is, from the net annual value or rent, as before explained—the average annual cost of repairs which fall upon the landlord, unless under express contract between him and the tenant the tenant is to bear it; insurance, which also falls upon the landlord, and other expenses—*i.e.*, as I read it, outlay on the premises necessary to maintain them in a state to command—that is, to be worth—such rent. The scheme of the Act is to ascertain the net annual value of the hereditament, whether let to a tenant or not, as a basis of the assessment, and to deduct from that net annual value the average annual cost of repairs, insurance, and landlord's outlay to keep the hereditament up to that net annual value.—"Rex v. Adams" (4 *B. & Adol.*). On these grounds I am of opinion in favour of the appellant.

DEATH FROM LEAD POISONING.

A CORONER'S inquest has been held on the body of a woman who had been employed at a white-lead factory in Limehouse for four months. When first engaged she was in good health, but she soon became ill. Her joints became weak, her teeth turned black, and she got palsied. She then was unable to work all the days of the week, and at length could not go to the factory at all. She was then seized with violent convulsions, and died. One witness said there were about twenty females employed at the factory. The hours were generally from six to six; but sometimes there was overtime, and they worked till nine, or even eleven o'clock at night. The females employed were for the most part young, but one person had been ten and another fifteen years in the factory.

A juror said that he knew numbers of healthy young women who were completely poisoned and "used up" in three or four years in white-

lead factories. A few only became acclimatised to the poisonous atmosphere.

Dr. Arnold said that he told deceased, while ill, that she was suffering from lead poisoning, and that her death was inevitable unless she gave up her work at the factory. She said that she had an aged mother to support as well as herself, and that she had no choice but to go to the factory or starve. Her death resulted from lead poisoning, accelerated by want of food. Doubtless she was rendered unable to take or eat sufficient food by the state of her teeth and gums, &c. from the poisoning of the blood. Some constitutions gave way under the action of the lead poisoning much sooner than others.

The jury returned a verdict "That the deceased died from the poison of white-lead, and that her death was accelerated through want of food, which the action of the poison rendered it difficult for her to take; and the jury are of opinion that, considering the deadly nature of the occupation, the hours of employment in white-lead factories are too long; and also that it would be desirable that there should be a systematic inspection of such establishments by a Government officer."

IRELAND.

Dublin.—The new Presbyterian church in Rutland-square has been opened. The edifice is in the Early English style, and occupies a frontage in Rutland-square of 62 ft., and measures from front rear, in North Frederick-street, a depth of 160 ft. The stronger portions of the building are constructed of Dalkey granite, and the ornamental columns, &c., of Portland stone. The quoins of the spire, which is octagonal, are constructed of Portland stone, and carved. The tower is pinnacled. It contains two-light windows, fitted in with slate louvres. The turret is about 100 ft. high, and the spire rises to a height of 180 ft. in all. Entering the church the vestibule is first reached. It is lighted by a stained-glass window in front. The flooring is of encaustic tiling. From the left a staircase leads to the gallery, which is fitted up to accommodate about 100 persons. Above it is a memorial window. It has six lights, and is filled in with stained glass. Gothic tracery fills the upper, and various texts and an inscription are depicted on the lower portion. The first, third, fourth, and sixth lights have a number of the beatitudes inscribed on them, and texts. Running along the lower part of the window, inscribed in coloured old English characters, is the line:—"This window was erected by the congregation of Mary's Abbey, to commemorate the munificence and perpetuate the name of Alexander Findlater, the founder and donor of this church." Mr. Ballantine, of Edinburgh, was the artist. From the vestibule doors open into each of the two aisles of the church, with their rows of pews on each side, capable of accommodating about 900 persons. The pews are constructed of red deal, stained and polished in imitation of oak, and each is ornamented in a *fleur-de-lis* end, differing alternately. The roof, which is about 80 ft. high, is groined in wood, and formed by numerous diagonal beams intersecting and resting upon pillars of Caen stone in groups of columns. A rose window, nearly 19 ft. in diameter, the work of Mr. Ballantine, is placed directly over the pulpit. Three stained-glass five-light windows are placed along the right side of the church; but there are none to the left, the existence of a building outside effectually preventing such a desideratum. Hot-air pipes are run along under the flooring of the building, and perforated plates above them, for heating purposes. Messrs. Edmundson & Co., of Dublin, have erected the gas-fittings. They consist of a series of coronas of polished brass, with thirty lights each. Below the church is an extensive school-room, 62 ft. long by 52 ft. wide, and at the farther end is a suite of rooms, including a large apartment for congregational purposes, with session and minister's rooms. Mr. A. Heiton, of Perth, was the architect; and Mr. Bolton, of Dublin, the builder. The estimated cost was 10,800*l.*; but the final cost has been upwards of 16,000*l.*, the whole of which has been defrayed by Mr. A. Findlater, of Dublin.

Iron Bridges for Servia.—Prince Couza has granted to an English company the concession for the construction of six iron bridges over the principal rivers in Servia. They are to be completed in three years.

RECENT PATENTS CONNECTED WITH BUILDING.*

Improvements applicable to Chimney-Tops and Ventilators.—*G. F. Chantrell & J. Reymond.* Dated 18th March, 1864.—The objects of this invention are to obtain an upward current in flues, and to prevent down-draughts therein; and a convenient mode of manufacturing the said chimney-tops and ventilators from clay, terra-cotta, and plastic or other material usually formed in moulds. A chimney-top or ventilator, constructed according to this invention, may consist of an octagonal, circular, square, or other suitably-shaped vertical hollow shaft, which the patentees prefer to enlarge at the base, and from near the bottom of which are formed three, four, or more air-passages, which extend obliquely upwards from the exterior of the base of the shaft, and open into the interior thereof at about say one-fourth the height of the shaft. The upper portion of the shaft they surround by a casing of larger internal area than the exterior of the shaft, and which tapers upwards, and is domed or otherwise contracted at the top above the main vertical shaft, to have an internal opening of equal or nearly equal area to the opening of the shaft. This outer casing they divide internally into eight, or any other convenient number, of vertical passages, by means of vertical diaphragms or partitions; these air-passages are open at the bottom, and extend above the edge of the vertical shaft within the same, or contracted head of the casing. The upper edge of the casing they surmount with a spiked or other suitable circlet.

Producing and Burning Combustible Gases for Heating and Lighting Purposes.—*F. J. Arnoldt.* A communication. Dated 19th February, 1864.—This invention consists, first, in constructing apparatus for producing combustible gases for heating or lighting purposes, of an upper and lower chamber in close contiguity, heated in any suitable manner, in the lower one of which chambers steam is decomposed by being made to pass through highly heated substances, with which the oxygen of the steam combines, while the liberated hydrogen is made to pass into the upper chamber, there to combine with carbonaceous gases resulting from the volatilisation of oil or liquid hydrocarbons introduced into such upper chamber, and whence the resulting combustible gases are conducted through one or more pipes either to burners situate below and serving to heat the apparatus, or to wherever required. Secondly, in the arrangement of apparatus for producing and burning combustible gases, as described.

A Machine to Press Bricks.—*A. Julienne & J. C. De la Combe.* Dated 25th February, 1864.—This invention cannot be described without reference to the drawings.

Artificial Stone.—*F. Ransome.* Dated 27th February, 1864.—Artificial stone has been manufactured by the present patentee by compounding sand and similar substances with soluble silicate of soda or potash, and then converting the soluble into an insoluble silicate by means of a solution of chloride of calcium, or other soluble salts capable of similarly acting on the soluble silicate. The chloride of calcium or other salt thus employed remains in excess in the artificial stone, and if it be afterwards dissolved out, either intentionally or by exposure to the weather, the stone is left slightly porous. Now, according to the present invention, he treats the artificial stone thus manufactured with a solution of such a nature as to decompose and precipitate an insoluble substance from the chloride of calcium, or other soluble salt, used to act upon the soluble silicate. The solution which he finds most suitable, and most commonly employed, is one of carbonate of soda, which decomposes the excess of chloride of calcium and precipitates from it carbonate of lime, which is deposited in and well fills the pores of the stone.

Piles or Cylinders for Piers, Embankments, Coffer-dams, etc.—*J. Phillips.* Dated 30th January, 1864.—This invention has for its object to render more or less perfectly water-tight the vertical joints, interstices, or spaces existing between metal piles or cylinders employed for structures that are wholly or partially under water, and consists in forming grooves, recesses, shoulders, or flanges upon the contiguous sides of such piles, and then inserting into such grooves or recesses, or against such shoulders or flanges, pieces of wood or other suitable material, so formed that the pressure of the water causes them to fit tightly against one or more surfaces of the grooves, recesses, shoulders, or flanges of two contiguous piles or cylinders, thereby preventing the water from penetrating through the joints, interstices, or spaces between the two piles to the back of the same. The patentee prefers to make the grooves in the piles and the pieces of wood to be inserted of a rectangular form, and he forms the lower extremity of the piece of wood with a double incline, so that, when driven into the ground in the said grooves, it is made of itself to press against the back surfaces of the two grooves and the side surface of one of them.

* Selected from the *Engineer's* lists.

Books Received.

The Domestic Service Guide. London: Lockwood & Co. 1865.

The comprehensive scheme of this work will be best and most briefly explained by quoting its full title. It is called "The Domestic Service Guide to Housekeeping, practical cookery, pickling and preserving, household work, dairy management, the table and dessert, cellarage of wines, home brewing and wine making, the boudoir and dressing-room, travelling, stable economy, gardening operations, &c.; being a handbook of the duties of the housekeeper, cook, lady's maid, nursery-maid, housemaid, laundry-maid, dairy-maid, butler, valet, footman, coachman, groom, and gardener; from the best and latest authorities, and the communications of families, in several hundred new receipts."

The author, we happen to know, is a most experienced and laborious literary man, and this is not the only work of its class issued by him; but his previous work has long been out of print as well as out of date in its information. The object of the present volume is to supply a book of information on domestic service, in which the best and latest notices of invention and discovery shall be made available for what the late Prince Consort once declared to be "the largest of all the classes of her Majesty's subjects in England,"—the class of domestic servants, now considerably above a million in number.

The work is no less adapted for the use of masters and mistresses than of servants of all kinds. It is well classified, and its information is made still more easily accessible by a good index. We are glad to observe that in each section special attention has been paid to health-giving and sanitary cautions and to adulterations of food, prevention of accidents by fire, and many other most useful and important subjects.

There are various minor improvements which might be made in a second edition, which the work will certainly not be long in reaching. Thus receipts might be given for other summer beverages besides ginger-beer, which stands alone in its class in the present volume. Lemonade, for example, is a preferable drink, but no receipt for it is given. Something should be said, under "Candles and lamps," as to the now very extensive use of petroleum oils among the middle classes. In a receipt for removing superfluous hairs, on page 205, we should advise a more clear allusion to the fact that one of the two receipts given itself contains arsenic, which substance is very properly reprobated as an ingredient in depilatories. And so on. The book will form a standard work of its class; and it well merits the attention of the public.

Lighthouses. By David Stevenson, F.R.S.E., M.I.C.E. Edinburgh: Adam & Charles Black. 1864.

This is a reprint from the Scottish periodical named "Good Words." It gives a condensed account of Robert Stevenson's Bell Rock Lighthouse, built in the years 1807-11, and of other lighthouses,—their modes of construction, illumination, and management. Of the Bell Rock Lighthouse we have already fully treated in the *Builder*. This small volume gives a popular and interesting account of it, by a relative of its well-known engineer.

VARIORUM.

"Letter to J. Thwaites, Esq., Chairman of the Metropolitan Board of Works. By James Knight, Surveyor." The author of this pamphlet has experimented on a small scale with sewage and other manures on land, and he is of opinion that neither the liquid nor the solid form is the most suitable, either for the soil or for farm practice; but that "slop," of the con-

sistency of new cheese, and capable of being conveyed in trucks, would be the best form of it for profitable application to the land, the filtered fluid from the sewage being run into the river. He recommends the adoption of such a plan for the southern sewage, and deprecates the scheme of Messrs. Hope & Napier as impracticable, and valueless to the ratepayers. The value of the metropolitan sewage in the form of slop, taken out to the country in railway trucks, and sold to farmers, he estimates at 80,000*l.* per annum; the quantity being calculated at 400,000 tons, and the price 3s. to 5s. per ton.——The author of "The Curiosities of London" announces a volume of "Walks and Talks about London," in which the great metropolitan changes now in progress will be prominently referred to.

Miscellanea.

THE NATIONAL GALLERY.—The Vestry of St. Martin's-in-the-Fields have received notice from the Office of Woods and Forests that the Government will require the whole of the workhouse and the site for the purposes of the National Gallery, and invites that body to send in their estimate of its value.

THE PROPOSED WATER COLOUR PAINTERS' SOCIETY.—The promoters of the proposed new general exhibition of water-colour drawings, which is to be distinct from anything now in existence in England, inasmuch as its members will not be banded together into a society, have secured, we hear, the Dudley Gallery of the Egyptian Hall, Piccadilly. The exhibition is to open on the 20th of February next.

PHOTOGRAPHING ARCHITECTS' DRAWINGS.—Our attention has been called to some photographic copies of engineers' drawings by Mr. W. Willis, of Birmingham. By means of a photographic process, copies of drawings can be made rapidly and cheaply of the same size as the original. The original drawing is in no way injured by the process, and the copy is produced by simple superposition over the chemically-prepared paper, and is a positive copy direct without the intervention of a negative.

PORTSEA.—An application has been made to Parliament for procuring certain amendments in the Act for regulating the affairs of St. John's Chapel, says the *Portsmouth Times*, of the 19th November. The chief amendments are that the incumbent may in future participate in the funds at the disposal of the Ecclesiastical Commissioners; that the right of presentation to the benefice be vested in a body of trustees, who are to be elected by the proprietors of pews; and that marriages may be celebrated in the church.

A MEMORIAL OF THACKERAY IN WESTMINSTER ABBEY.—Immediately after Mr. Thackeray's death, a committee of gentlemen, with Mr. Shirley Brooks for hon. secretary, determined on the erection of a memorial to their friend, and obtained the sanction of the Dean of Westminster to its location in the Abbey. The exact site has now been selected, and a marble bust of the author of "Vanity Fair," will shortly be placed close behind the effigy of him whom Thackeray so honoured and eulogised—Joseph Addison. The bust will be executed by Baron Marochetti, who was on terms of intimacy with Mr. Thackeray.

NEW QUEEN'S PRINTING ESTABLISHMENT, CANADA.—The new Queen's printing-offices now in course of construction at Ottawa, for the united provinces of Upper and Lower Canada, are being erected for Mr. George Desbarats and the Hon. Malcolm Cameron, Queen's printers for the provinces, with rapidity; Messrs. Stent & Laver being the architects. The building, six stories in height, is constructed with solidity and with some taste. The total cost when completed will be about 10,000*l.* The contractor for the whole work is Mr. James Goodwin, of Ottawa. The erection of this building is regarded in Canada as a precursor of the early intended removal of the Government from Quebec to the new capital, selected not only by the Queen as the capital of the united Canadas, but also named from its central location as the Federal seat of Government by the intercolonial delegates who recently held a convention at Quebec to devise the best means for uniting from the Atlantic to the Pacific all the British American dependencies.

THE ROYAL MAUSOLEUM, FROGMORE.—The massive sarcophagus, which is intended to be placed in the new mausoleum at Frogmore as a receptacle for the remains of the Prince Consort, has been conveyed to the grounds at Frogmore. It is of a dark polished Scottish granite.

ARCHITECTURAL INSTITUTE OF SCOTLAND.—At the annual general meeting of the Architectural Institute of Scotland, to be held in the Hopetoun Rooms, Edinburgh, on the 7th instant, the Right Hon. the Lord Provost in the chair, the report of the Council will be read, and a paper by Mr. John Dick Peddie, "On the Doric Temple."

THE CONSERVATIVE LAND SOCIETY.—The twelfth annual meeting was held on Tuesday, the 29th November. The report stated that the receipts for the year were 81,242*l.* 15s. 3d., an increase over the previous year of 5,488*l.* 9s. 10d.; that the grand totals were 782,389*l.* 13s. 10d.; the sale of land, 368,800*l.* 13s. 10d.; the total withdrawals 231,487*l.* 1s. 7d.; that the society has acquired fifty-five estates in twenty-one counties; that 21,228 50*l.* shares have been issued, representing 1,061,400*l.*; and that the reserve fund was now 11,000*l.* A dividend of 5½ per cent. per annum was declared.

"JUNIOR ATHENÆUM CLUB."—This new club, intended to consist of members of both Houses of Parliament, members of the Universities, Fellows of the Learned and Scientific Societies, and gentlemen connected with literature, science, and art, is now fairly launched, and we are disposed to think quite successfully. Premises have been obtained in King-street, St. James's (29), and have been tastefully fitted for the purpose, decorated and furnished, under the direction of Mr. E. Roberts. These are exceedingly snug and commodious, but will probably have to give place to a more extensive building in a few years. The committee dined together in the new house with some few friends, on Saturday last, Mr. James Heywood, F.R.S., presiding genially, when it was stated that more than 900 names of candidates for membership had come before them. From these about 300 had been elected, the committee looking jealously as to eligibility. There is wide room in this yearly increasing Babylon for another club, where men of all parties treading the paths of art, literature, and science may meet on common ground; and we think it will be found that the Junior Athenæum has not been established too soon.

MRS. LIRRIPER ON BUILDERS.—Ah! it's pleasant to drop into my own easy-chair my dear, though a little palpitating, what with trotting upstairs and what with trotting down, and why kitchen stairs should all be corner stairs is for the builders to justify, though I do not think they fully understand their trade and never did, else why the sameness and why not more conveniences and fewer draughts and likewise making a practice of laying the plaster on too thick I am well convinced which holds the damp, and as to chimney-pots putting them on by guesswork like hats at a party, and no more knowing what their effect will be upon the smoke bless you than I do if so much, except that it will mostly be either to send it down your throat in a straight form or give it a twist before it goes there. And what I says speaking as I find of those new metal chimneys all manner of shapes (there's a row of 'em at Miss Wozenham's lodging-house lower down on the other side of the way) is that they only work your smoke into artificial patterns for you before you swallow it and that I'd quite as soon swallow mine plain, the flavour being the same, not to mention the conceit of putting up signs on the top of your house to show the forms in which you take your smoke into your inside.—*Mrs. Lirriper's Legacy.*

THE SAXONS.—Mr. John Brent has finished his excavations in the Saxon cemetery, at Sarr, in Thanet, for the present year. He laid open nearly 300 graves, some of especial interest. As an example one contained four fibulæ (two circular and two cruciform); five gold pendants, which, with the fibulæ, are elaborately ornamented; a very large crystal ball, set in a silver-gilt frame for suspension; a silver-gilt perforated spoon, set with garnets; an elegant footless glass cup, a silver ring, beads, and other objects, such as buckles, shears, and keys. The weapons, implements, and ornaments from Sarr, are deposited in the Charles Museum, at Maidstone. The Kent Archæological Society provided the funds at Mr. Brent's disposal in aid of the expenses for labour, &c.

CAMBERWELL.—Application is to be made to Parliament by the South Metropolitan Gaslight and Coke Company, for power to purchase Christ Church, Camberwell, and provide a new site for a church in its place.

AN ODD WAY OF PAYING WAGES.—In the Norwegian mines, a singular custom is observed in paying the weekly wages of the men. They all present themselves on Saturday evening to the inspector, who, having settled accounts with each, bids him turn round, and writes in white chalk upon his black back the sum due to him. Thus numbered, the man goes to the cashier, who also turns him round to look at the figures, and pays him without having a word to say.

WOLVERHAMPTON BOROUGH SURVEYORSHIP.—There were fifty-five candidates; and, after the committee had devoted about four hours to the examination of the testimonials, the number of candidates was reduced to six. The following are the gentlemen thus selected:—Mr. Anthony Morgan, Leamington; Mr. Joseph Gordon, Carlisle; Mr. Samuel Harpur, Merthyr Tydvil; Mr. William Crutchley, Wakefield; Mr. James Lemon, Spring Garden, London; Mr. John William Gray, 31, Cloudesley-terrace, London. We have received just complaints that proper attention could not have been paid to the testimonials submitted *in four hours!*

PUBLIC BUILDINGS FOR BURTON-UPON-TRENT. At a private but influential meeting held at the local Commissioners' Offices, Mr. Bass, M.P., moved "That it is the opinion of this meeting that public buildings are required in the town of Burton-upon-Trent, and that such building should include some or all of the following, viz., a market-hall, town-hall, including assembly-rooms and reading-rooms, town-commissioners' offices, baths and wash-houses, museum, and dispensary." The resolution was carried unanimously, and a committee appointed to inquire into the most eligible site for the proposed buildings, and to report to a public meeting.

THE PROPOSED ROAD FROM CADOGAN-PLACE TO SOUTH KENSINGTON.—We are glad to find that notice has been renewed of intended applications to Parliament in the ensuing session to introduce a Bill for the construction of a new thoroughfare from Cadogan-place, Chelsea, to the South Kensington Museum. The Bill will give power to the company intending to apply to Parliament for it to make a street or road commencing at Pont-street, in the parish of St. Luke, Chelsea, crossing Cadogan-place and Sloane-street, and terminating in the Cromwell-road or Brompton-road, Old Brompton, near the east end of the South Kensington Museum.

ANOTHER SCOTTISH "NATIONAL MONUMENT" SUGGESTED.—A correspondent of the *Scotsman* proposes, for the projected Albert Memorial, the crowning of the brow of the imaginary lion formed by the sky outline of Arthur's Seat, one of the Edinburgh hills, with "an open shrine, in the shape of a colossal regal crown. Visible from all sides, and even from the sea, nothing," he continues, "could be more graceful than the arched ribs of the crown meeting in the centre to support an ornamental cross. The whole structure, including the rim of the crown, should consist of open work, and this would render its outlines perceptible and distinct at distances whence an opaque building could hardly be discerned. In the interior, immediately below the cross, a statue might be placed." Another correspondent thereupon sarcastically suggests, that to complete the likeness of the lion with the regal crown, the tail must be considered. "It might at first sight seem desecration," he remarks, "to break the sublime curve of the rump by the insertion of this appendage; but a deeper study of the subject will undoubtedly prove that it would add to the completeness of the design, and bestow on it a fresh beauty. The whole structure of the tail should consist of open work, so as to render its outlines perceptible and distinct: it should, in fact, be a lofty arch of masonry, springing from the brow of Sampson's Ribs, on which a bold mass of appropriate stonework, slightly curled, would represent the hairy tuft that terminates the caudal appendage of the genus *Leo*; and, rising gradually across the Queen's Drive, terminate at the appropriate part of the leonine back above. Visible from all points, and even from the sea, nothing could be more graceful than this arched tail—a tail under which glimpses of the heavens would appear, and which would give an animated and dignified aspect to the whole lion."

South Shields New Theatre Company.—At a meeting of the intending shareholders and others interested, it was resolved to apply forthwith for the registration of the company. Directors and officers for the company were appointed.

Fires.—Another great fire has taken place at Bermondsey, where extensive premises at the Dockhead, containing saltpetre, jute, sugar, and other stores, have been destroyed, after burning on for several days without ceasing. The jute, from the joint action of water and fire, swelled so as to burst out the walls, a large portion of which 30 or 40 yards in length and 18 ft. or 20 ft. high, fell into the road. At Devonport Dockyard, also, a store has been destroyed by fire. Surely all these serious fires will at last lead to a reform in the construction of such buildings as those destroyed, so as to render them thoroughly fireproof.

Tyne and Newcastle-upon-Tyne Improvements.—Notices have been given of intention to apply to Parliament for provisions for facilitating the construction of Tynemouth Docks,—extension of time for completing works; additional works at Northumberland Docks; supply of water to Northumberland Docks by Newcastle and Gateshead Waterworks Company; powers for removal of water-pipes and use of the High-level Bridge of the North-Eastern Railway Company; tunnel under River Tyne for gas and water pipes; and for other purposes connected with the improvement of the Tyne. For the improvement of Newcastle-upon-Tyne, the notice relates to provisions for new police-court; further powers as to sewerage and utilization of sewage; removal and rebuilding of certain hospitals; further powers of improvement; new streets and improvements, &c.

St. George's Church, Campden-hill, Kensington.—This church has been consecrated by the Bishop of London. The edifice contains above 1,100 sittings, of which one-third are free and unappropriated. Mr. Bassett Keeling was the architect. The district to be attached to the new church will include 154 villas built, or about to be built, in Holland Park. When the present vicar of Kensington, Archdeacon Sinclair, was appointed, three churches and an unconsecrated chapel formed the whole parish provision for public worship in connexion with the national church. There are now seventeen churches and chapels, affording accommodation for 19,640 persons. The whole population of the parish is about 80,000. It is proposed to build three additional churches,—one between St. Paul's, Onslow-square, and St. Mary's, West Brompton, which is about to be commenced; another in Notting-hill; and a third, St. Stephen's, South Kensington, for which subscriptions are in progress, but which cannot be proceeded with until the precise direction of the proposed railway between Kensington and Brompton has been determined.

Sanitary State of Bath.—The Board of Guardians of the Bath Union lately commissioned one of their medical officers, Mr. Frederick Hanham, to report upon the health of the districts in the vicinity of the Avon, from Bathford westward to Twerton. Mr. Hanham has accordingly submitted to the Board an elaborate statement of the results of his investigations, from which it appears that there is pressing necessity for an increased water supply; and better drainage and purification of the Avon. Details are given sufficient to prove that the localities nearest the stream are the unhealthiest, and that the disease which there proves fatal in a large number of instances is one which is universally attributed to the noxious exhalations inseparable from bad drainage and a contaminated stream. The average mortality of the city districts was 25 in every 1,000 of the population; the average mortality of the rural districts 24 in every 1,000, taking the returns of the year ending September last; so that the country parishes bordering on the river were not, as a whole, much better than the city, and no one of them was so salubrious as Bathwick. The investigations have brought out one special point very clearly, viz., that the parts of Bath inhabited by the opulent, such as the upper sections of Lansdown and Bathwick, are healthier than many country parishes. Another point is, that a large per-centage of the mortality in the lower quarters of the city, and in the villages skirting the Avon, may be reduced by the improvement of the drainage and the purification of the river.

The Carlisle City Surveyorship.—Mr. Gordon, the city surveyor, having applied for an increase of salary, or for leave to accept private practice beyond the municipal boundary, the Council have adopted the latter alternative in order to retain his services. Mr. Gordon had become a candidate for the surveyorship of Wolverhampton, where the salary is 400*l.* a year, whereas Mr. Gordon's is only 240*l.* He would have expected 100*l.* more from the Carlisle Council. Mr. Gordon was one of the fifty-five candidates for the office at Wolverhampton, and had been selected as one of the six among whom the final competition lay.

The new Iron Floating Bridge connecting Portsmouth with Gosport.—This is 100 ft. long (or 16 ft. longer than the present bridge) and about 60 ft. wide. The contract was taken by Messrs. Lewis & Stockwell, iron ship-builders, of Blackwall, London, who entrusted the engines and machinery to the firm of James Watt & Co., of London and Soho. The engines are of the collective nominal power of fifty horses, with duplicate boilers,—the condenser, air-pump, and frame being all combined. Two large and roomy cabins, above 8 ft. high, are placed at each end, and are well lighted by means of domes or cupolas, which are further utilized on the upper deck to form comfortable seats for the passengers. Attached to the machinery are a pair of oscillating engines, which may be worked on the carriage-deck by means of a lever, and which give the option of raising and lowering the prows by either hand or steam power.

Water Supply, etc.—A Company has been formed for the purpose of erecting Water-works, Baths, Public Assembly and Reading Rooms at West Worthing. The capital required is 20,000*l.*, to be raised in 2,000 shares of 10*l.* each. Arrangements have been made with the West Worthing Investment Company, to supply sea and spring water to all the houses to be erected upon twenty-five acres of their land which lies immediately adjacent to the company's property. The company also proposes to erect a swimming bath for ladies, and another for gentlemen.——Soon after the death of the Prince Consort the inhabitants of Frant resolved to form a public well, and identify the undertaking with the memory of the Prince. Unavoidable delay occurred, but subsequently a well was sunk which yielded an abundant supply of pure spring water. The chief stone of this well has just been laid by Lady Caroline Nevill amid great rejoicings of the inhabitants.——A spring of water having been presented to the inhabitants of Chippenham by Mr. M. Esmeade, the cost of introducing it into the borough for the supply of the town has been given by Sir John Neeld, Bart. The cost will not exceed a hundred guineas.——The inhabitants of Ruthin have resolved on the erection of water-works to supply that town.

TENDERS.

For new chapel at Patriotic Asylum, Wandsworth. Mr. Rhode Hawkins, architect:—

Cubitt	£5,496	0	0
Mansfield	5,449	0	0
Clemence	5,389	0	0
White	5,263	0	0
Longmire & Burge	5,240	0	0
Myers & Sons	5,135	0	0

For additional water works, Rugby:—

Contract No. 1.

To construct engine-house, reservoir, filter, and filtered water tank; also laying about 2,250 yards of 7-inch cast-iron pipes, with bends, and sundry other pipes:—

Knowles & Docwra	£1,700	0	0
Hilton	1,133	0	0
Read & Bounce (Pipe-laying, 3s. per yard)	1,400	10	0
Bromwich	1,295	0	0
Bennett (accepted)	1,033	0	0
Freeman (special)	639	0	0

Contract No. 2.

For grass-hopper engine, capable of raising 200 gallons of water per minute to a height of 200 ft. through the 7-in. pipe; a set of three-throw pumps; also a centrifugal pump, with driving-gear, suction-pipes, and cocks:

Handyside & Co.	£695	0	0
Death & Eldwood	630	0	0
Middleton (accepted)	536	10	0

Contract No. 3.

To supply about 2,250 yards of 7-in. cast-iron socket-pipes, with bends, at per ton:—

Keightley	pipes	£8	12 6
	bends	10	0 0
Bromwich (for each sort)		6	19 0
Staveley Iron Company	pipes	5	17 6
	bends	8	17 6
Oakes & Co.	pipes	6	15 0
	bends	9	5 0
Cochrane & Co.*	pipes	5	15 0
	bends	9	0 0

* Accepted.

For alterations and additions to a semi-detached residence, New Malden, Surrey, for Mr. W. Tebb. Mr. G. Welch, architect:—

Macers	£270	0	0
Jones	195	0	0
Parker	193	0	0

[Sir,—I think you will join me in my opinion that publicity ought to be given to the following tenders:—]

For alterations to the casual wards of Fulham Union. Quantities not supplied. Mr. W. L. Gomme, architect:—

Pitts	£413	8	0
Snelling	357	0	0
Mansell	348	0	0
Chamberlin	330	0	0
Wilson	240	0	0
Martin (accepted)	194	0	0

For alterations to "Duke of Sutherland," Lorrimore-road. Mr. Isaac Bird, architect:—

Tracey & Co.	£648	0	0
Brown	640	0	0
Rowe	621	0	0
Marsland & Son	550	0	0
Henshaw	545	0	0

For Alterations and additions to the City of London Tavern, Bishopsgate-street:—

Tracey	£573	0	0
Sellec	556	0	0
Bryant & Baugh	550	0	0
Harvey	476	0	0

For completing three houses, Woodford. Mr. Gliddon, architect:—

Alfred Skinner	£977	10	0

TO CORRESPONDENTS.

Ignoramus (must do his own "sums").—H. B. & B.—J. O'D.—G. S.—W. J.—T. D. B.—S. & S.—G. L.—An Engineer.—G. A. A.—Fact (shall of course have attention if substantiated).—C. G.—G. R.—A. W. B.—J. E. H. (Institution of Builders' Foremen, &c. 9, Conduit-street).—Mr. C. (forwarded).—E. P.—J. P. P.—W. S.—J. B. P.—P. C.—W. S.—J. W.—J. R.—W. L.—F. & Co.—S.—H. C.—T. K. G.—E. W.—W. H. R.—J. H. M.—G. H. R.—T. M. T.—G. W.—Mr. W.—Vice Admiral G.—H. de M.—J. C.

A Looker-on (complains that, a contractor having failed, the architect would not allow the sureties to employ their own builder to finish, but gave the work to his clerk of the works, the sureties having to see him paid. We cannot discuss such a matter *ex parte*).—J. E. L. (in type).—W. & B. (hereafter).—Mr. N.—R. P. (not yet published).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender; not necessarily for publication.

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